Manuscript Report No. 90-06

Summary of Fish Population Data from Sipiwesk and Cross Lakes, 1989

By Green, D.J. 1990

Manitoba
Natural Resources
Fisheries

90-05069/

Green, D. J. 1990.

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Manitoba Department of Natural Resources,
Fisheries Branch MS Report No. 90-06, 72pp.

ABSTRACT

Experimental netting was continued on Sipiwesk and Cross lakes in 1989 under Claim #18 of the Northern Flood Agreement. Fish population data collected from these lakes during the open water season has been summarized and presented in this report in order to make it more easily accessible for future reference.

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INTRODUCTION

Cross and Sipiwesk lakes are located on the Upper Nelson River System. Cross Lake is immediately downstream of Manitoba Hydro's Jenpeg Generating Station while Sipiwesk Lake is just downstream of Cross Lake. Lake Winnipeg Regulation and the operation of Jenpeg Generating Station both have an influence on water level and flow conditions through these two lakes.

In 1985 an Ecological Monitoring Program under the auspices of the Northern Flood Agreement was initiated to investigate and document the possible impact of hydro development of fish populations within the Churchill River Diversion and Nelson River Systems. Cross and Sipiwesk lakes were two of the six lakes chosen for annual sampling.

The purpose of this report is to present the fish population data collected from Cross and Sipiwesk lakes in 1989 in a form that will make it readily and more easily available for future reference.

METHODS

Fish samples were collected with standard gangs of gillnets. These gangs consisted of various mesh sizes as follows: 1.5", 2.0", 3.0", 3.75", 4.25" and 5.0" stretched measure. Each net was 22.9 m (25 yd) long and 1.8 m (6 ft) deep. In Cross Lake an additional panel (5.25 inch mesh size) was added to the standard gangs in order to simulate a previous study by Gaboury and Patalas (1981). Gillnet sets were set on the bottom and overnight for 16 - 20 h duration.

Fork length and round weight measurements were recorded for all fish caught. Sex and state of maturity were recorded and ageing structures were taken from the principal commercial fish species of lake whitefish, cisco, walleye, sauger and northern pike. Ageing structures were collected as follows: otoliths and first three pectoral fin rays from whitefish and cisco, otoliths and first three dorsal spines from walleye and sauger and the left cleithrum and first three pectoral fin rays from northern pike.

In this study, Cross Lake was divided into two separate basins. This was consistent with the study by Gaboury and Patalas (1982) who felt the eastern basin of Cross Lake held a different population of fish to that of the west basin. Consequently, Cross Lake was treated as two lakes (West Cross and East Cross) and two samples of fish were produced.

Summaries and growth curve analysis were performed by the same methods as described by Patalas (1984) and Kirton (1985).

RESULTS

Sampling areas and netting locations for the 1989 program remained consistent with previous years in Sipiwesk Lake (Figs. 1-4) and fairly consistent in West Cross Lake (Figs. 5-8). A total of 40 sets were made in Sipiwesk Lake from June 12 - July 1 (Table 1), while 16 sets were made in West Cross Lake from August 9 - 23 (Table 2). No sets were made in East Cross Lake. The frequency and sequence of location varied depending upon fishing success, weather and water level conditions.

As in 1988, there was an unusually low water level found in Cross Lake during the summer field season. Areas where nets had been set in the past were to shallow, weed chocked or dry. New netting locations similar to those spots used in 1988 were used in 1989 (Figs. 6-8). No sets were made in Cross Lake East Basin because of low water that prevented adequate navigation and net setting conditions.

Catch-per-unit-effort was highest in West Cross Lake (Table 3). It should be noted that West Cross Lake was fished with 175 yard long net gangs instead of the standard 150 yard lengths in order to simulate a previous study by Gaboury and Patalas (1981). Numbers and total weight of each species caught are given in Tables 4 and 5. Mesh size effects on the various species (Tables 6-18) show expected findings, whereby fish caught in progressively larger meshes tend to be older and larger in size. Age class percent frequencies from the total column of Tables 6-8 were used to derive age composition graphs (Figs. 9-13). Species specific fork length frequencies are illustrated in Figs. 14-22. Fork length frequencies were also constructed for non quota species (sucker, etc.) where fish numbers were adequate.

Age specific size and maturity conditions for each sex and sexes combined are given in Tables 19-28. Information from these tables was used to derive mortality and survival estimates (Table 31), maturity rate equations (Table 32) and growth curve analysis (Tables 33-35, Figs. 23-25). Figures 23-25 illustrate the von Bertallanfy curve (solid line) and least squares regresion power curve (dashed line) along with respective equations. The solid squares on these figures represent points which were omitted (Walford and Brody analysis) during the derivation of the von Bertallanfy equation. Age classes, 0, 1 and 9 were omitted from the growth curve regression analysis for northern pike from West Cross Lake. Length-weight regression are given in Tables 29 and 30.

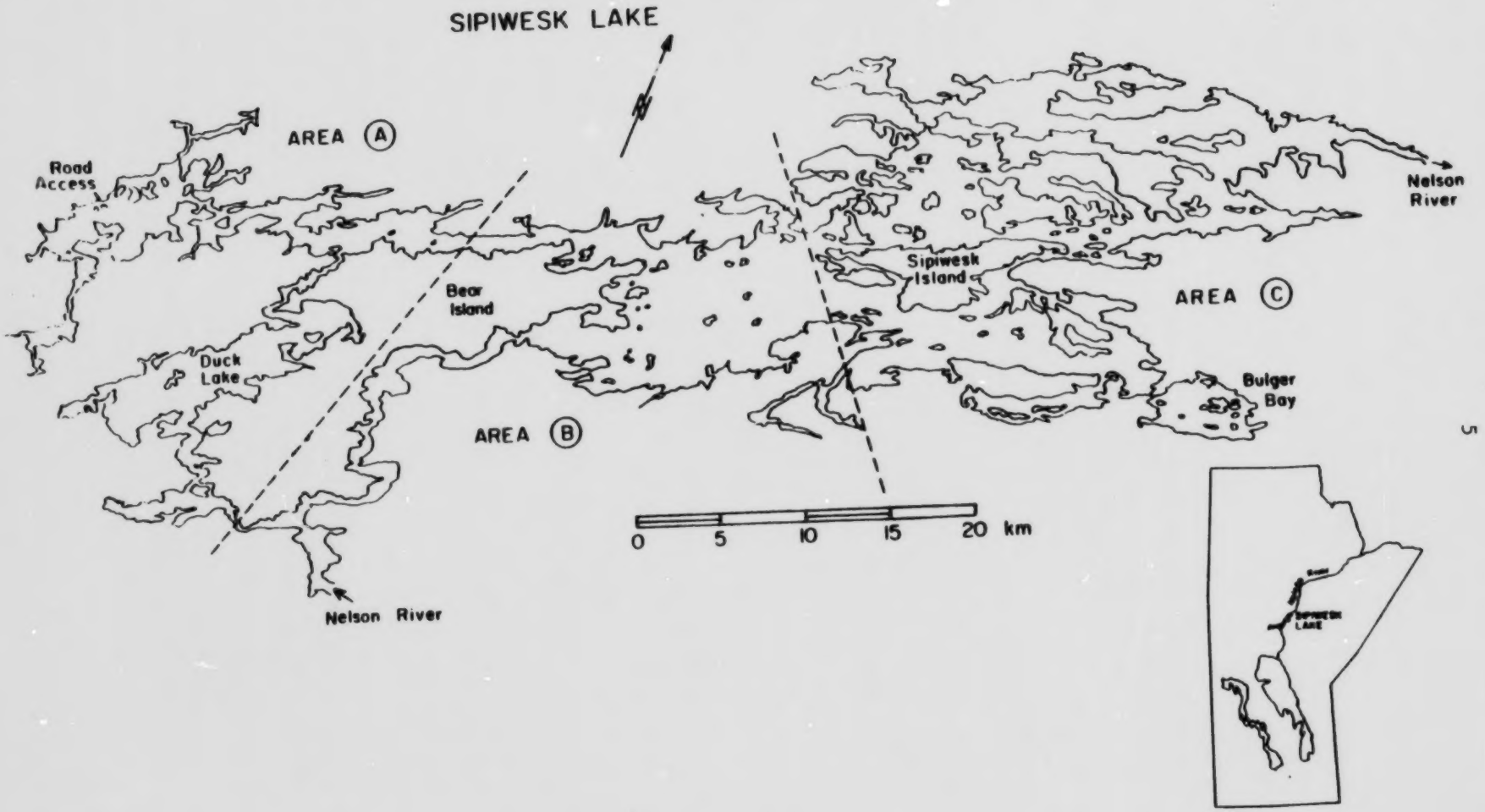

Fig. 1. Map showing location of Sipiwesk Lake and three designated netting areas used in 1989.

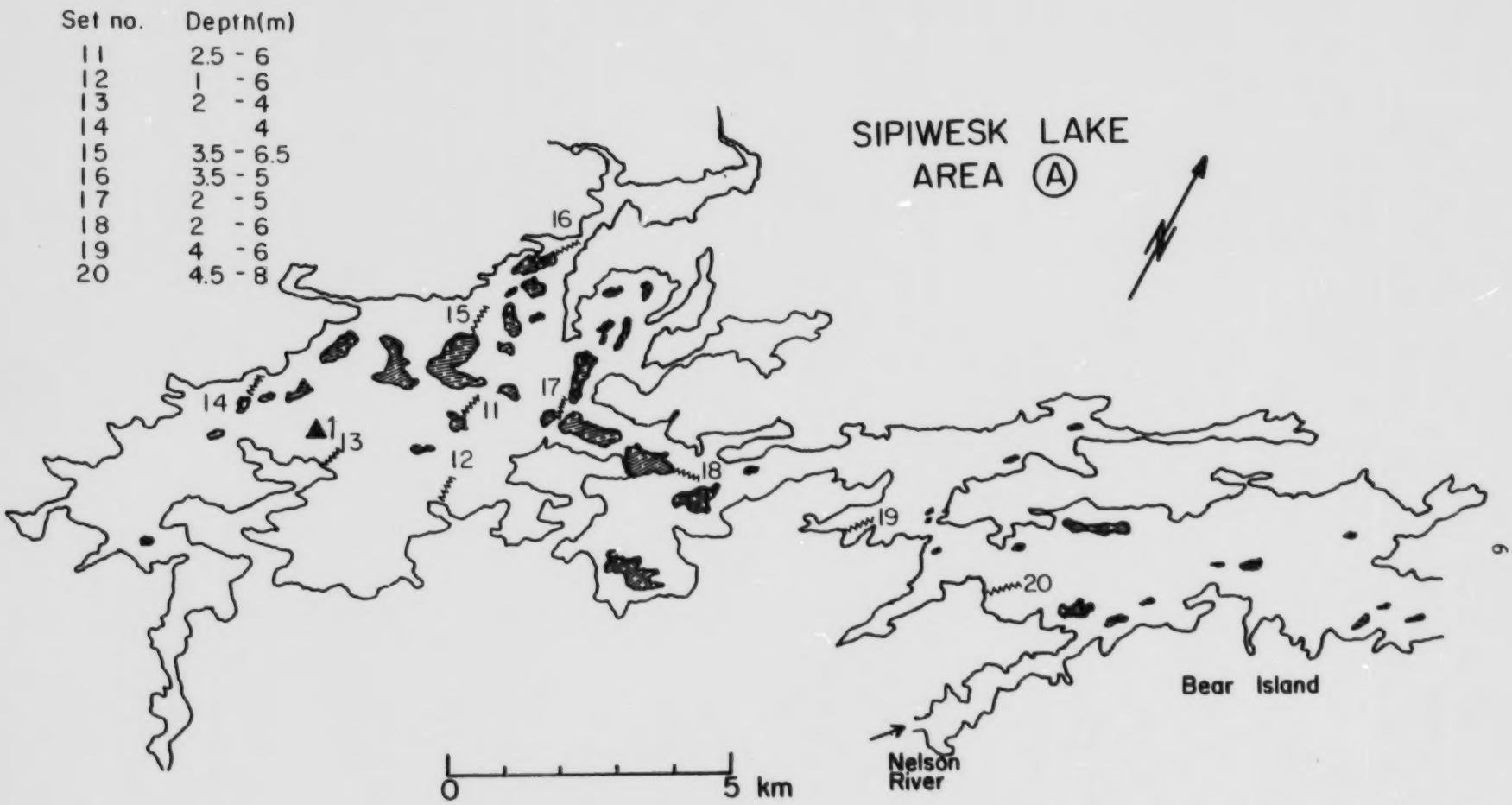

Fig. 2. Netting locations and depths of sets in Area A of Sipiwesk Lake, 1989.
▲1 = limnological sampling site.

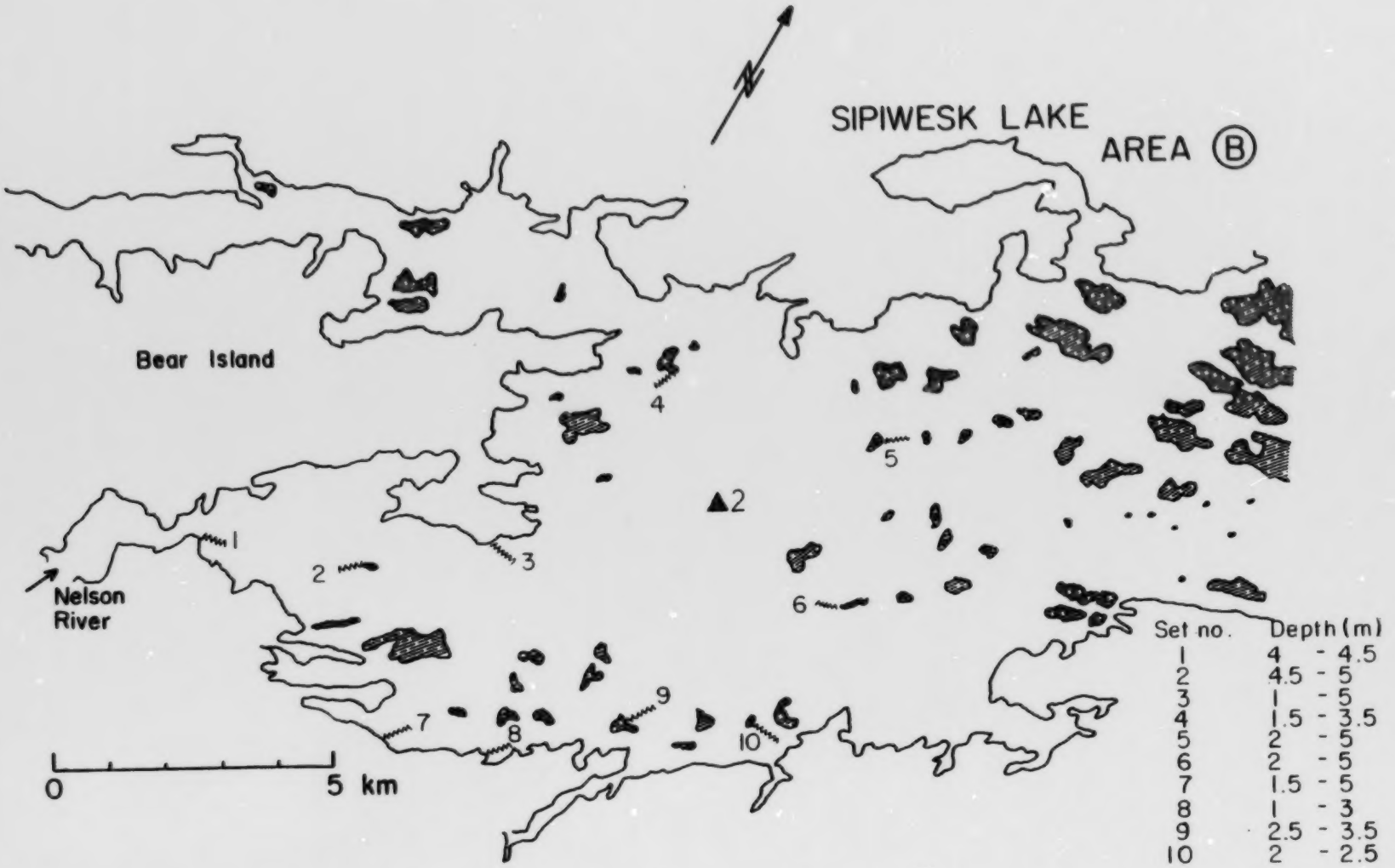

Fig. 3. Netting locations and depths of sets in Area B of Sipiwesk Lake, 1989.
▲2 = limnological sampling site.

Fig. 4. Netting locations and depths of sets in Area C of Sipiwesk Lake, 1989. ▲3 = limnological sampling site.

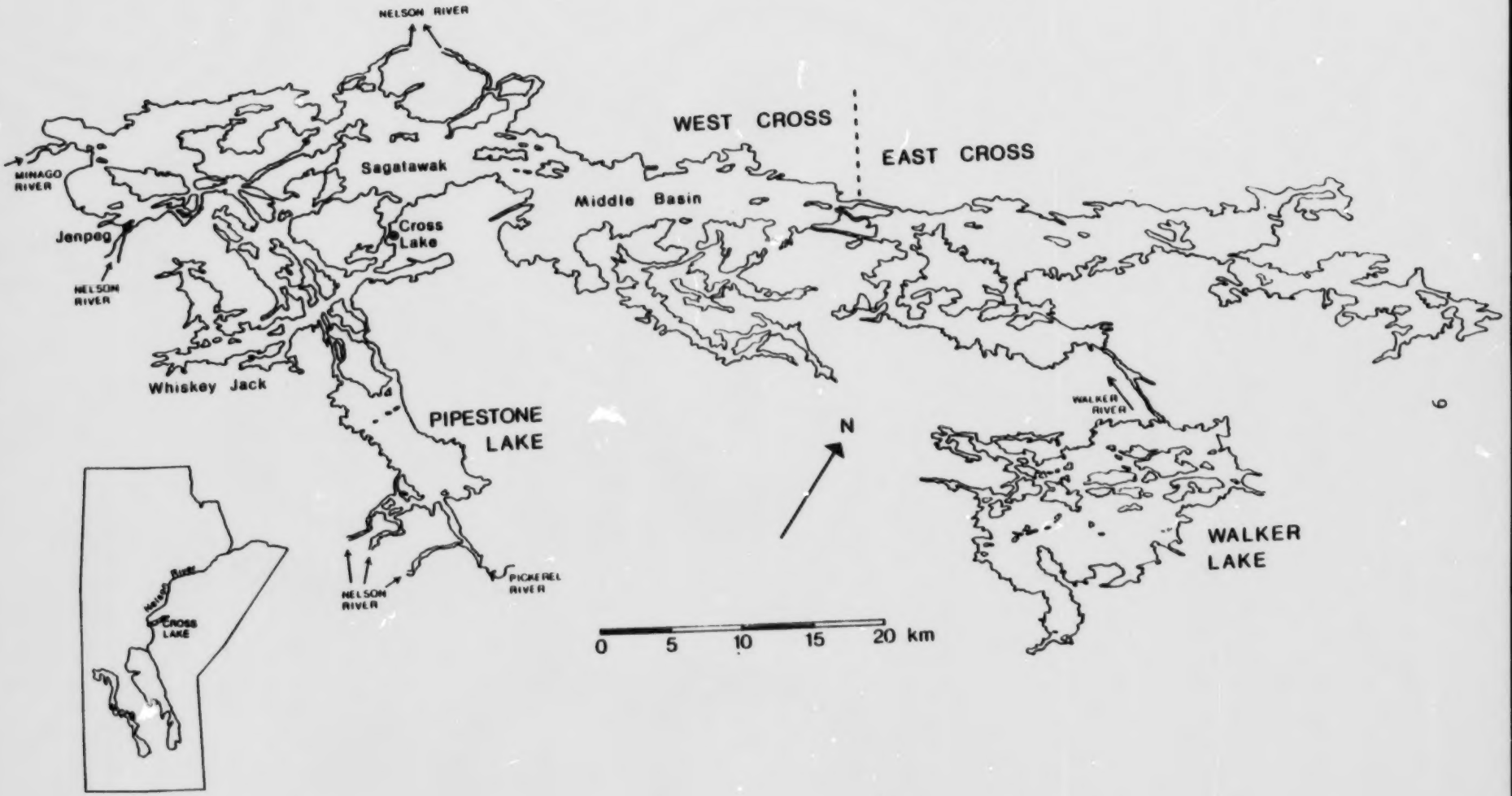

Fig. 5. Map showing location of Cross Lake and designated working areas used in 1989.

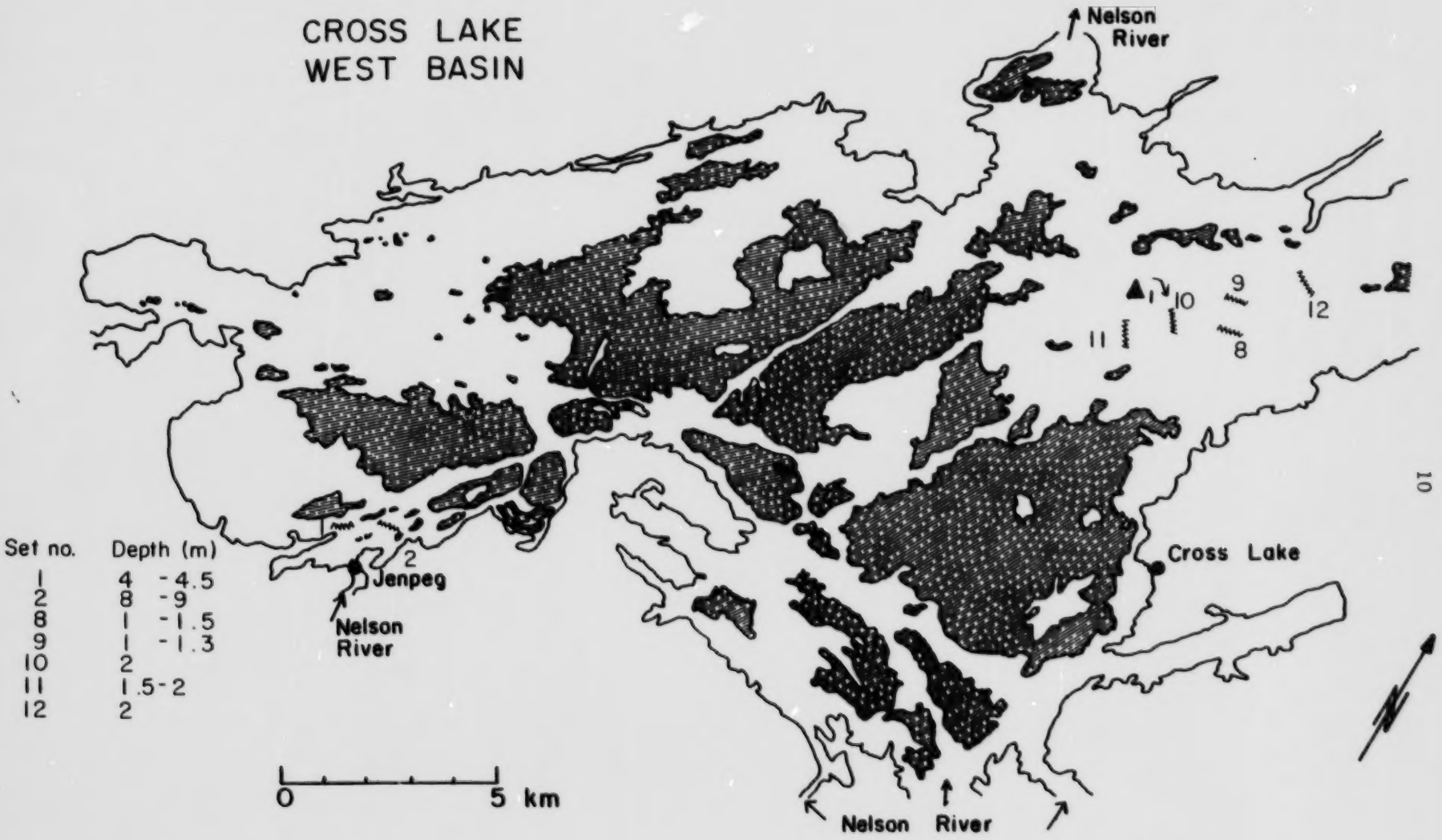

Fig. 6. Netting locations and depths of sets from Cross Lake west basin, 1989. ▲1 = limnological sampling site.

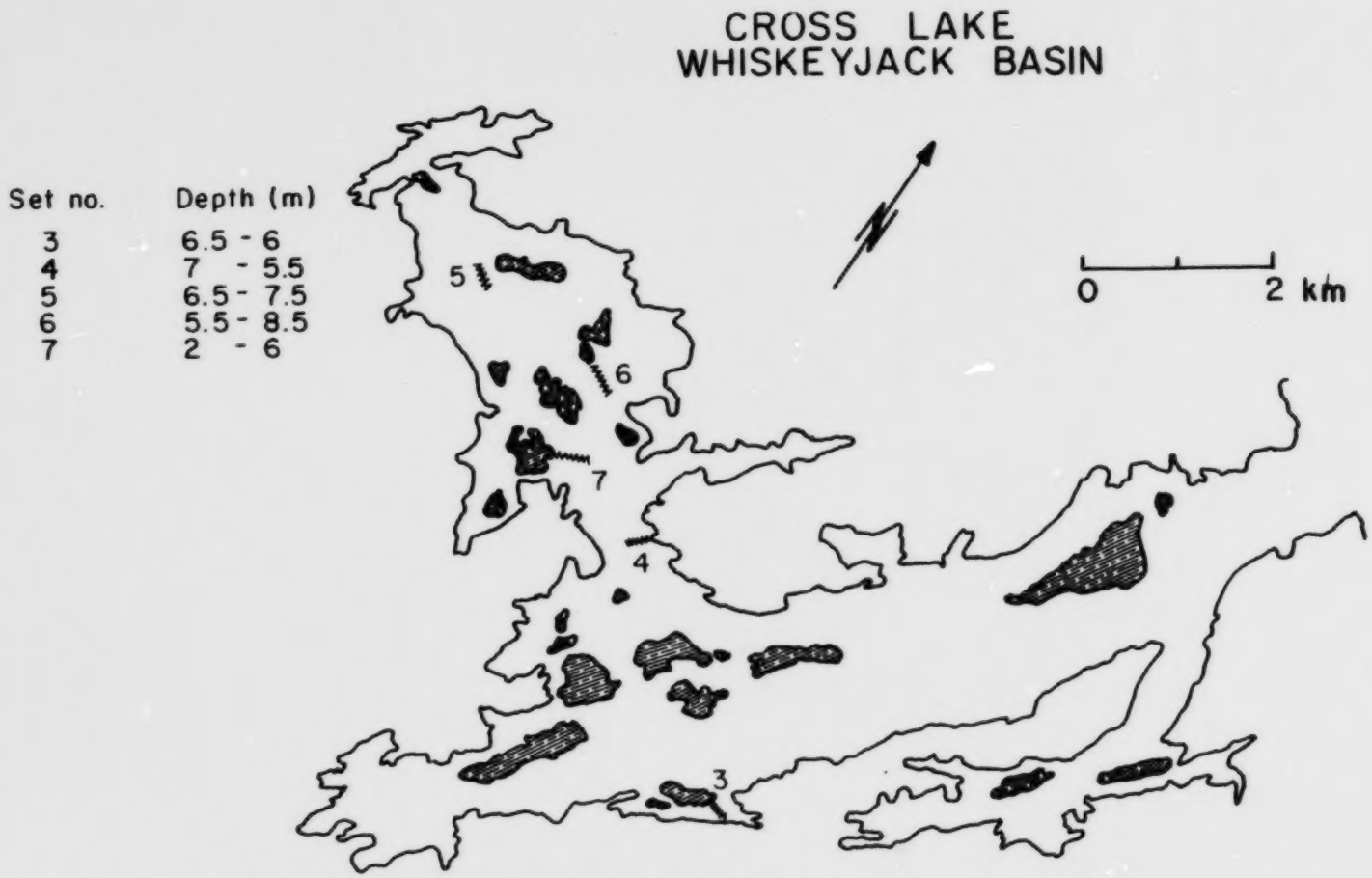

Fig. 7. Netting locations and depths of sets in Whiskeyjack Basin of West Cross Lake, 1989.

Fig. 8. Netting locations and depths of sets from Cross Lake Middle Basin, 1989. ▲2 = limnological sampling site.

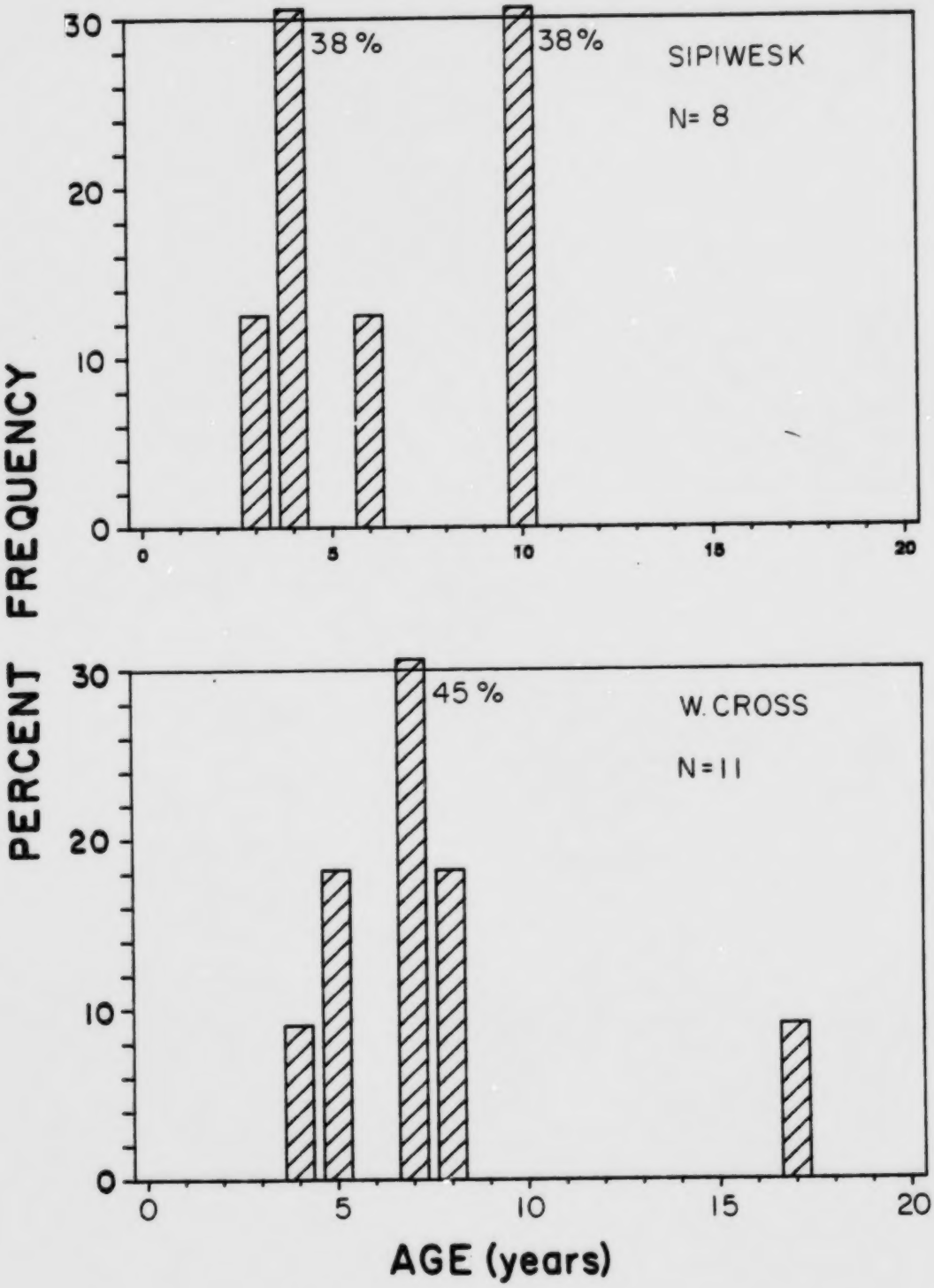

Fig. 9. Age compositions for whitefish from Sipiwesk and West Cross lakes, 1989.

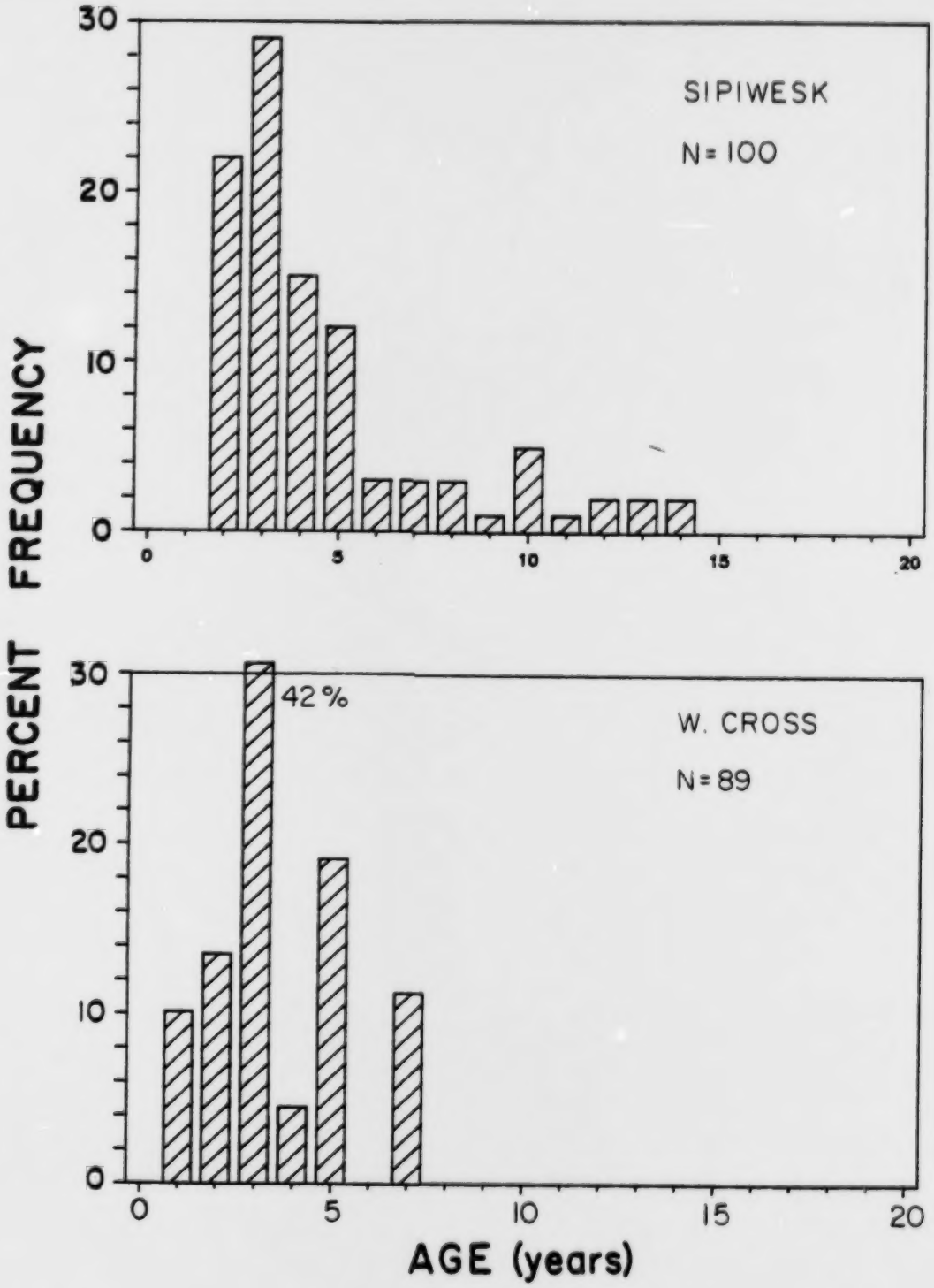

Fig. 10. Age compositions for cisco from Sipiwesk and West Cross lakes, 1989.

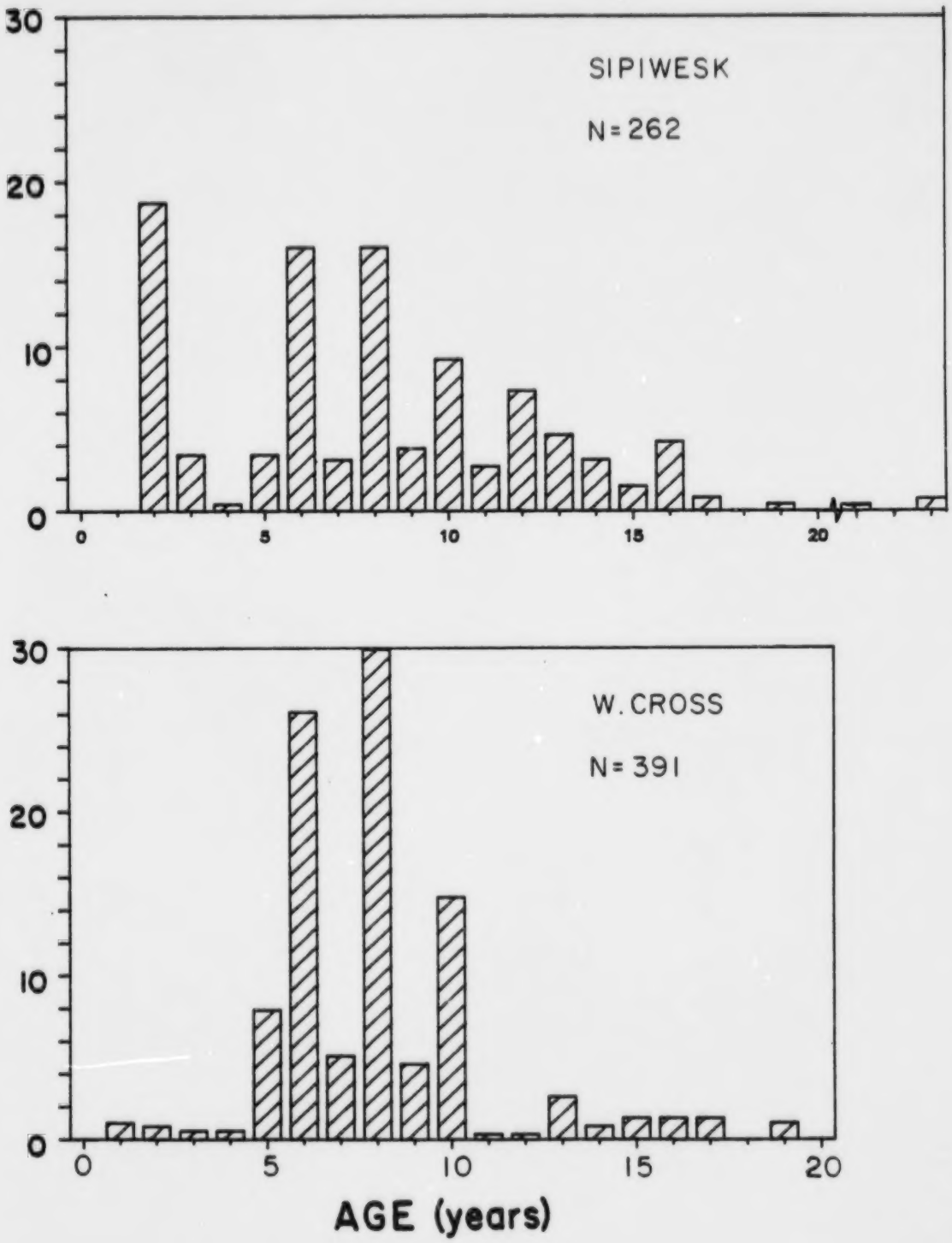

Fig. 11. Age compositions for walleye from Sipiwesk and West Cross lakes, 1989.
* represents ages 22 and 24
** represents age 26

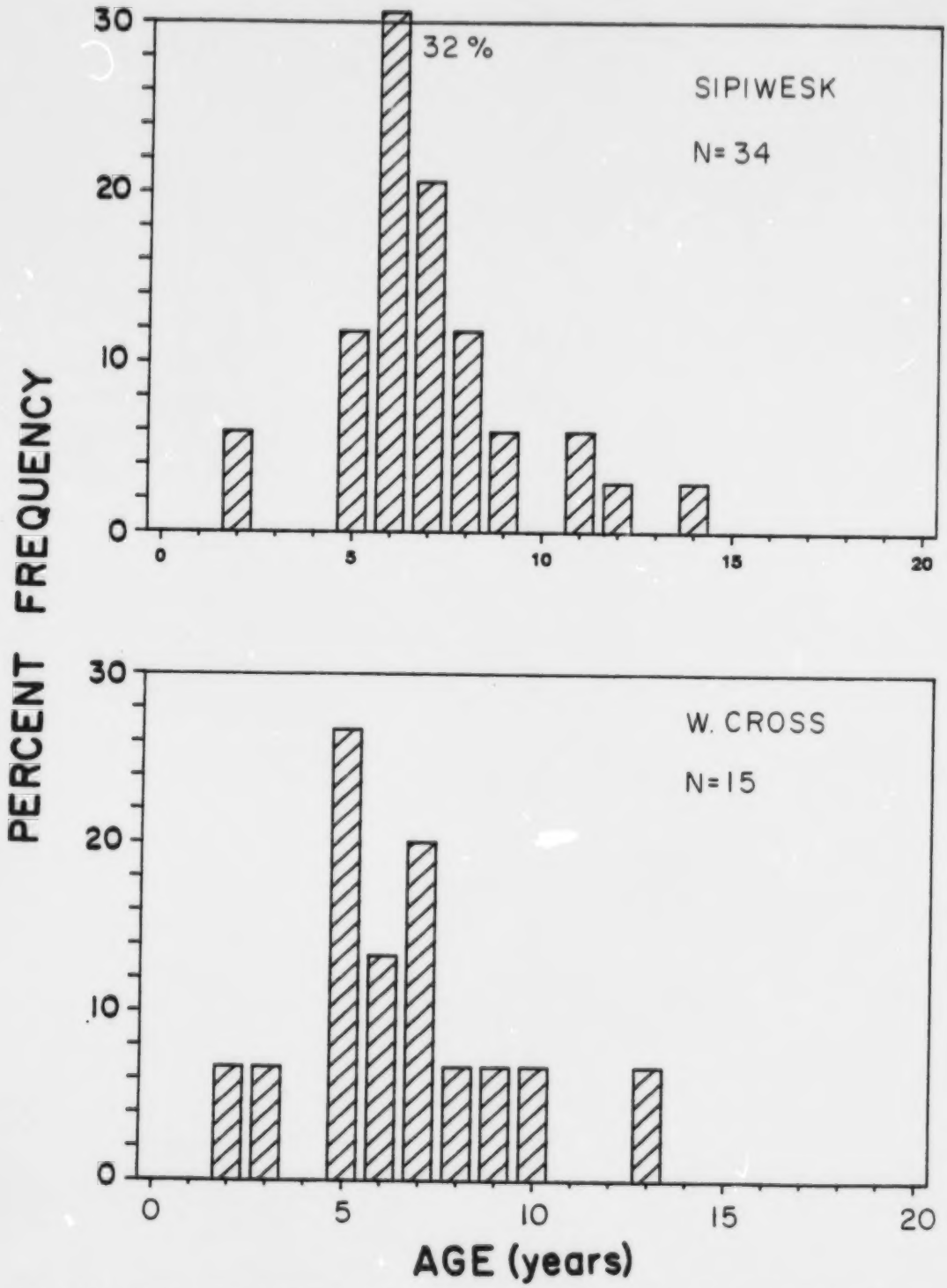

Fig. 12. Age compositions for sauger from Sipiwesk and West Cross lakes, 1989.

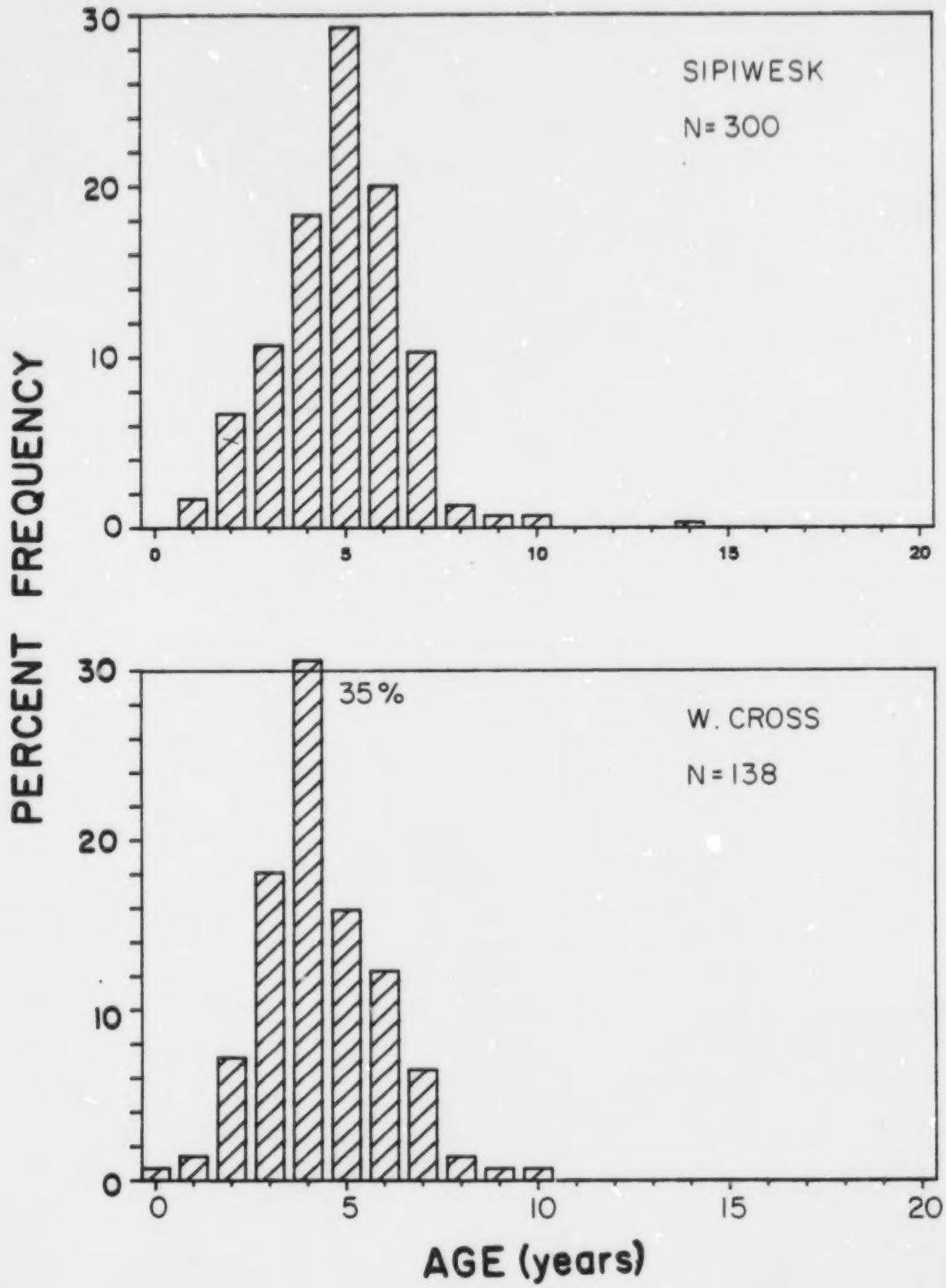

Fig. 13. Age compositions for northern pike from Sipiwesk and West Cross lakes, 1989.

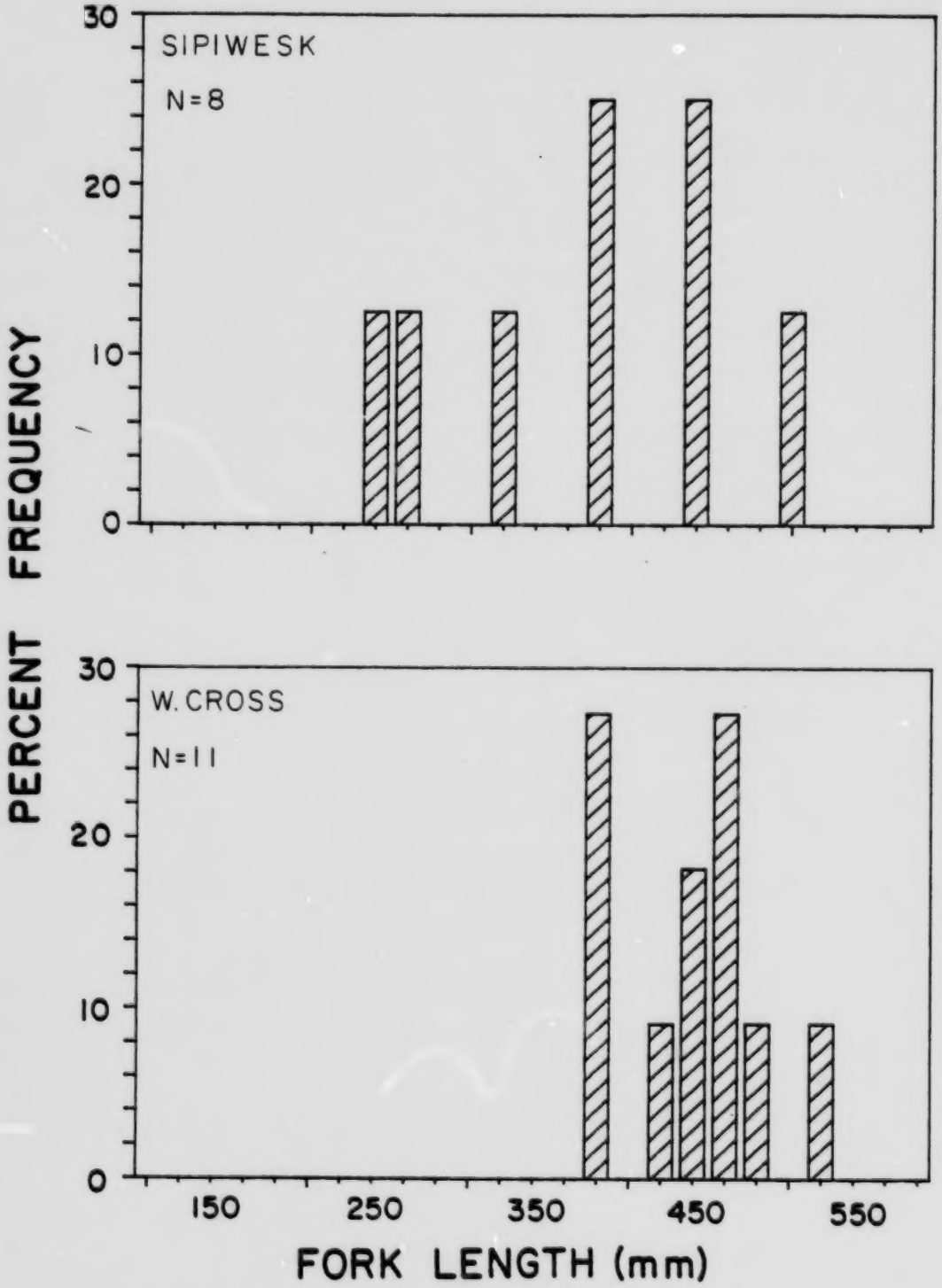

Fig. 14. Fork length frequencies for whitefish from Sipiwesk and West Cross lakes, 1989.

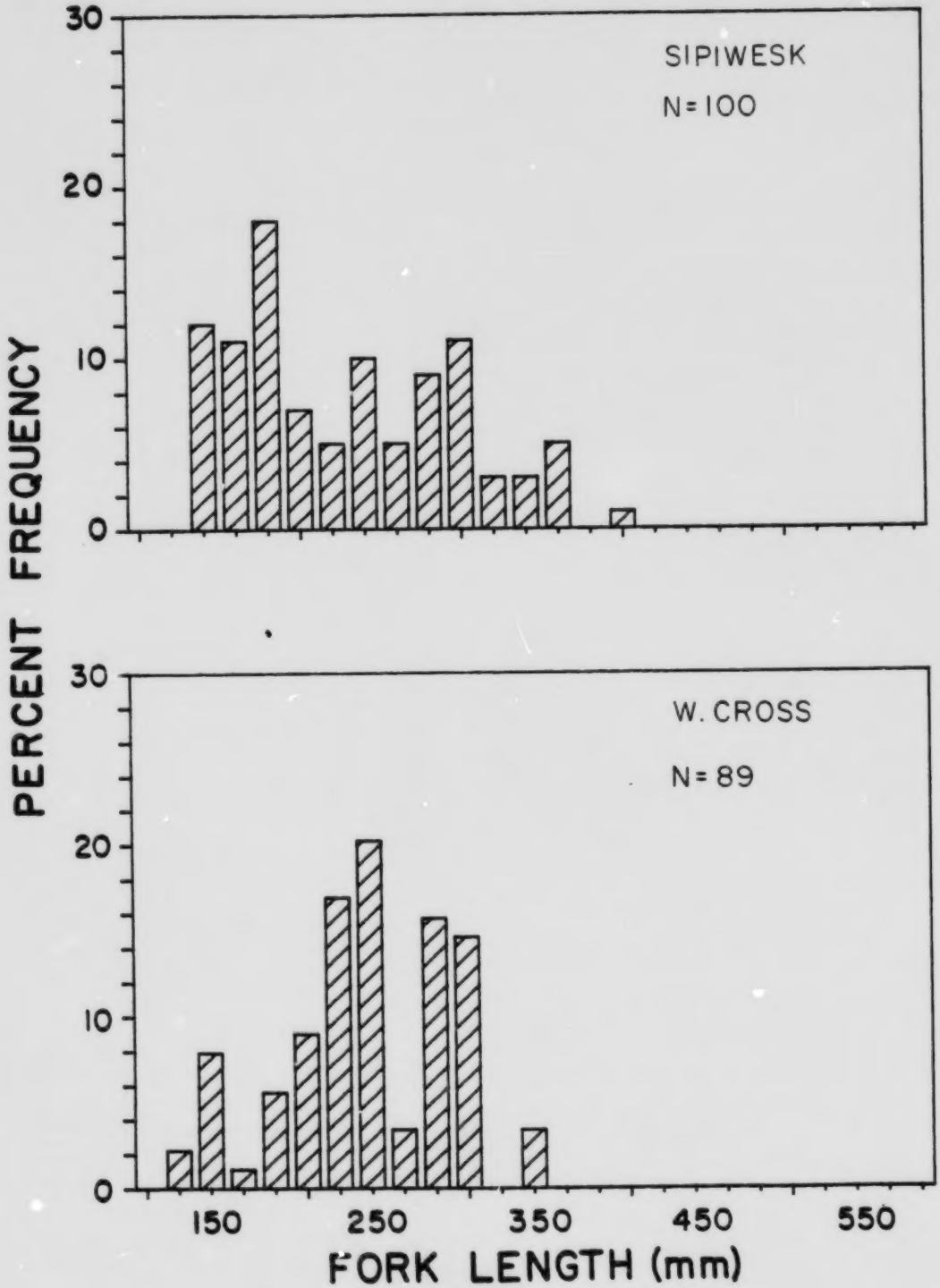

Fig. 15. Fork length frequencies for cisco from Sipiwesk and West Cross lakes, 1989.

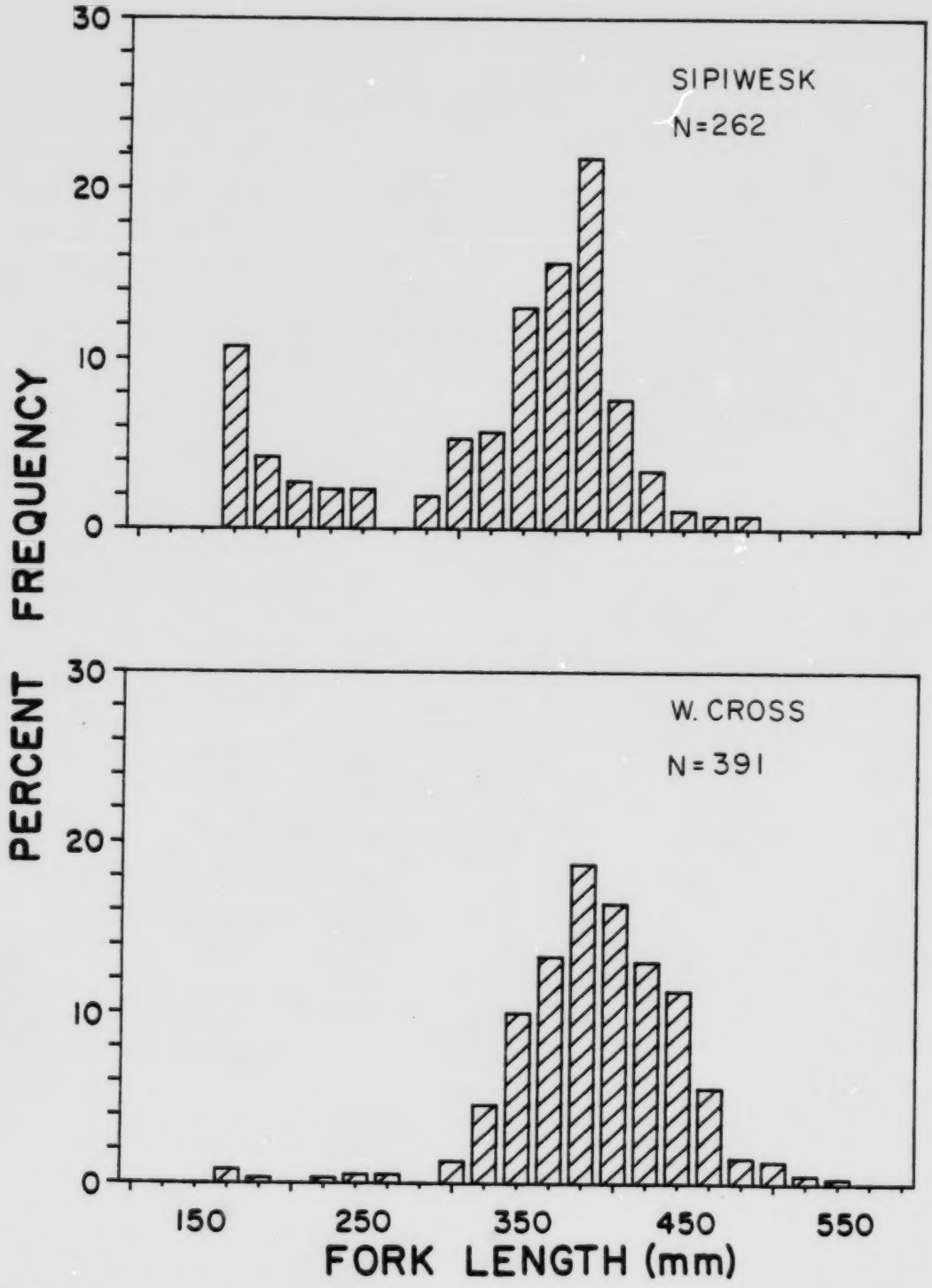

Fig. 16. Fork length frequencies for walleye from Sipiwesk and West Cross lakes, 1989.

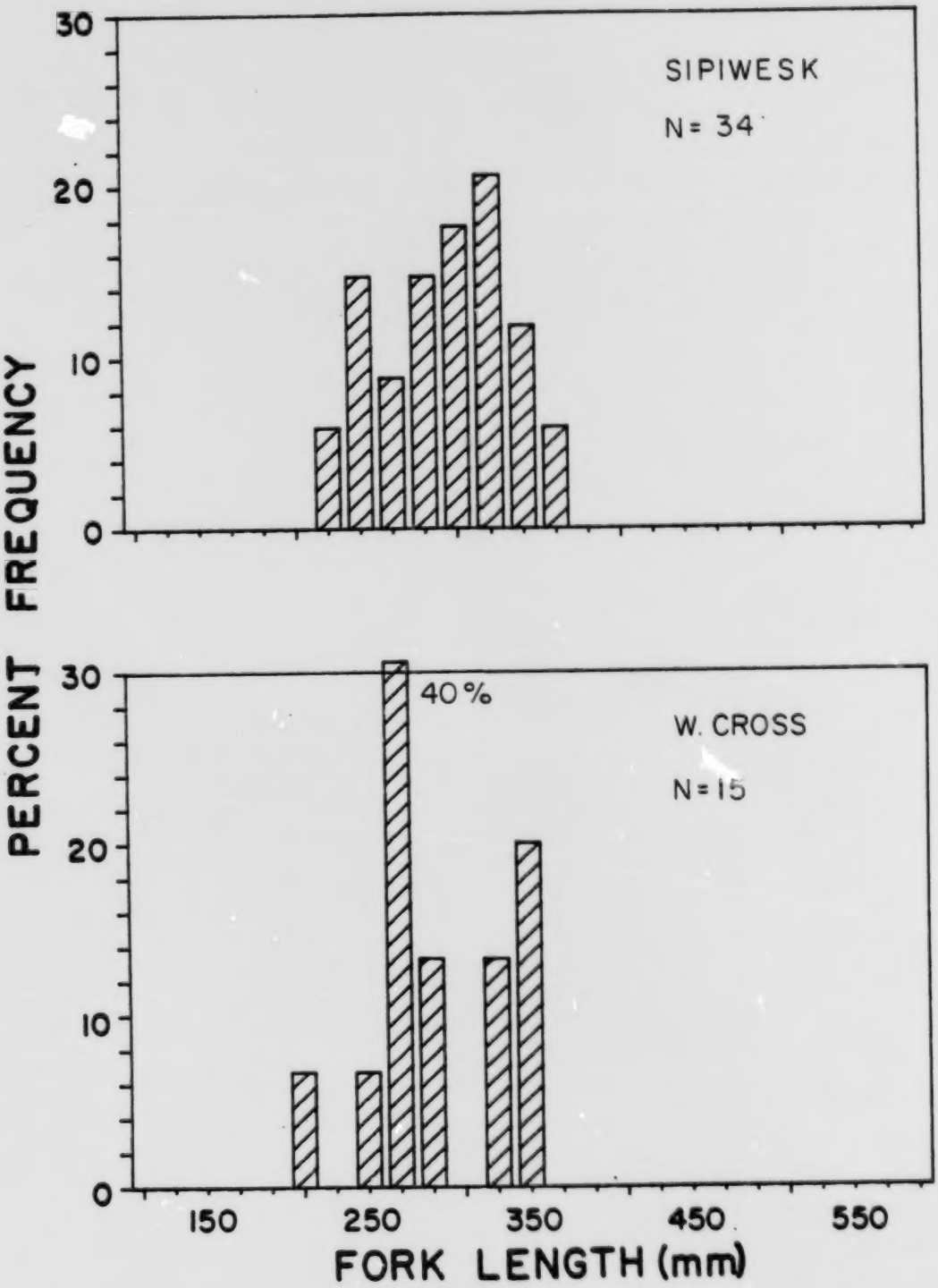

Fig. 17. Fork length frequencies for sauger from Sipiwesk and West Cross lakes, 1989.

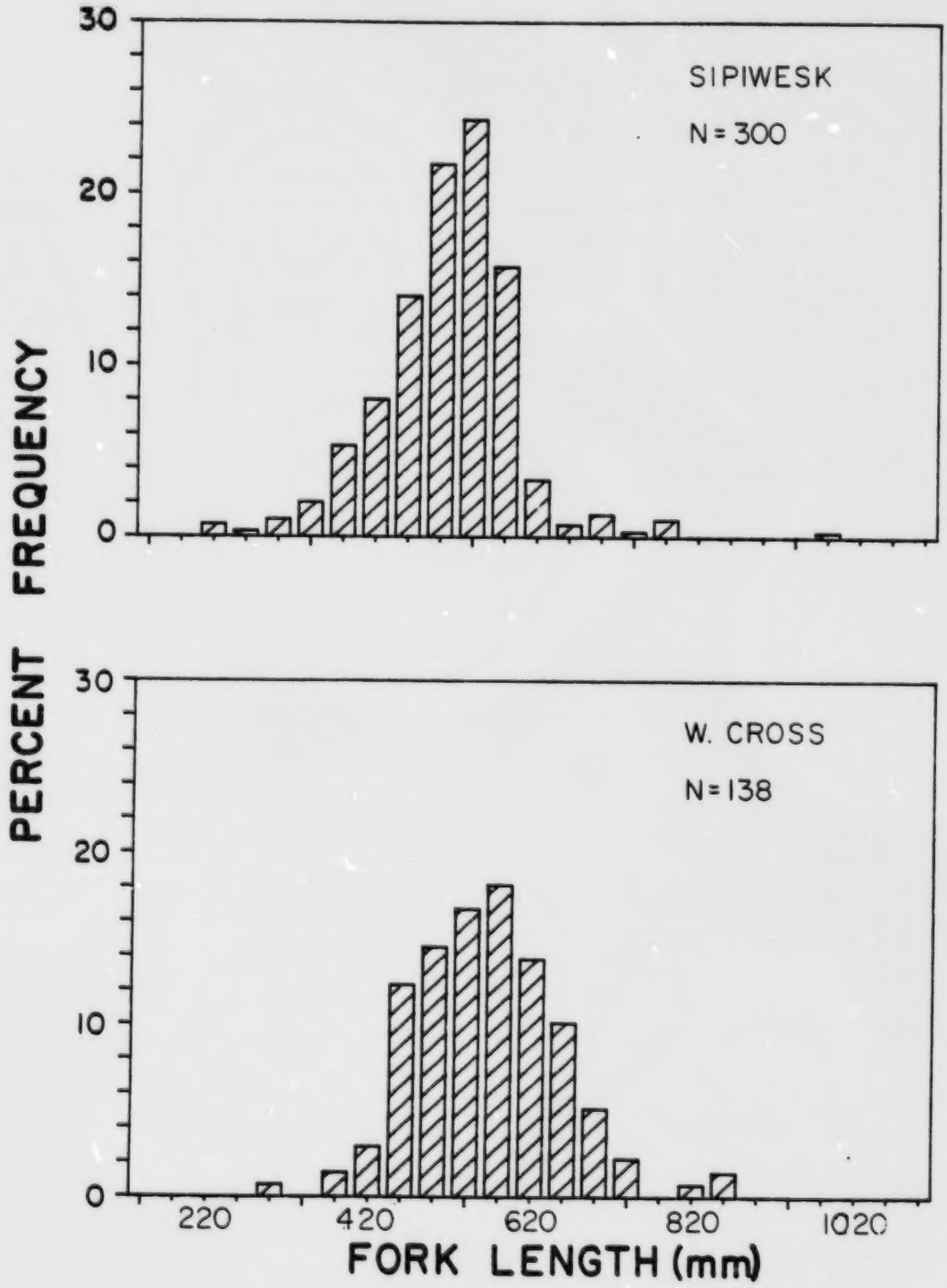

Fig. 18. Fork length frequencies for northern pike from Sipiwesk and West Cross lakes, 1989.

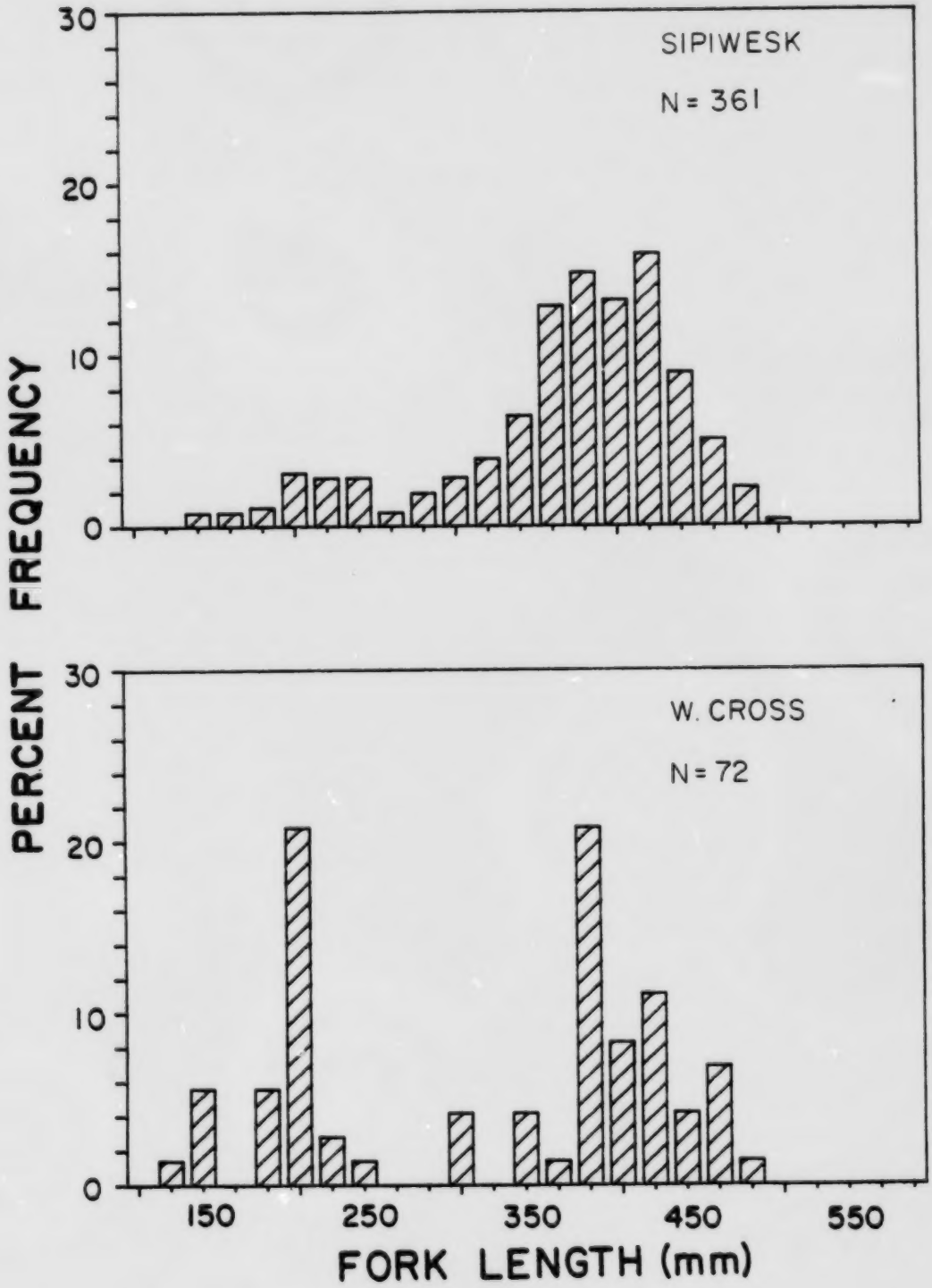

Fig. 19. Fork length frequencies for white sucker from Sipiwesk and West Cross lakes, 1989.

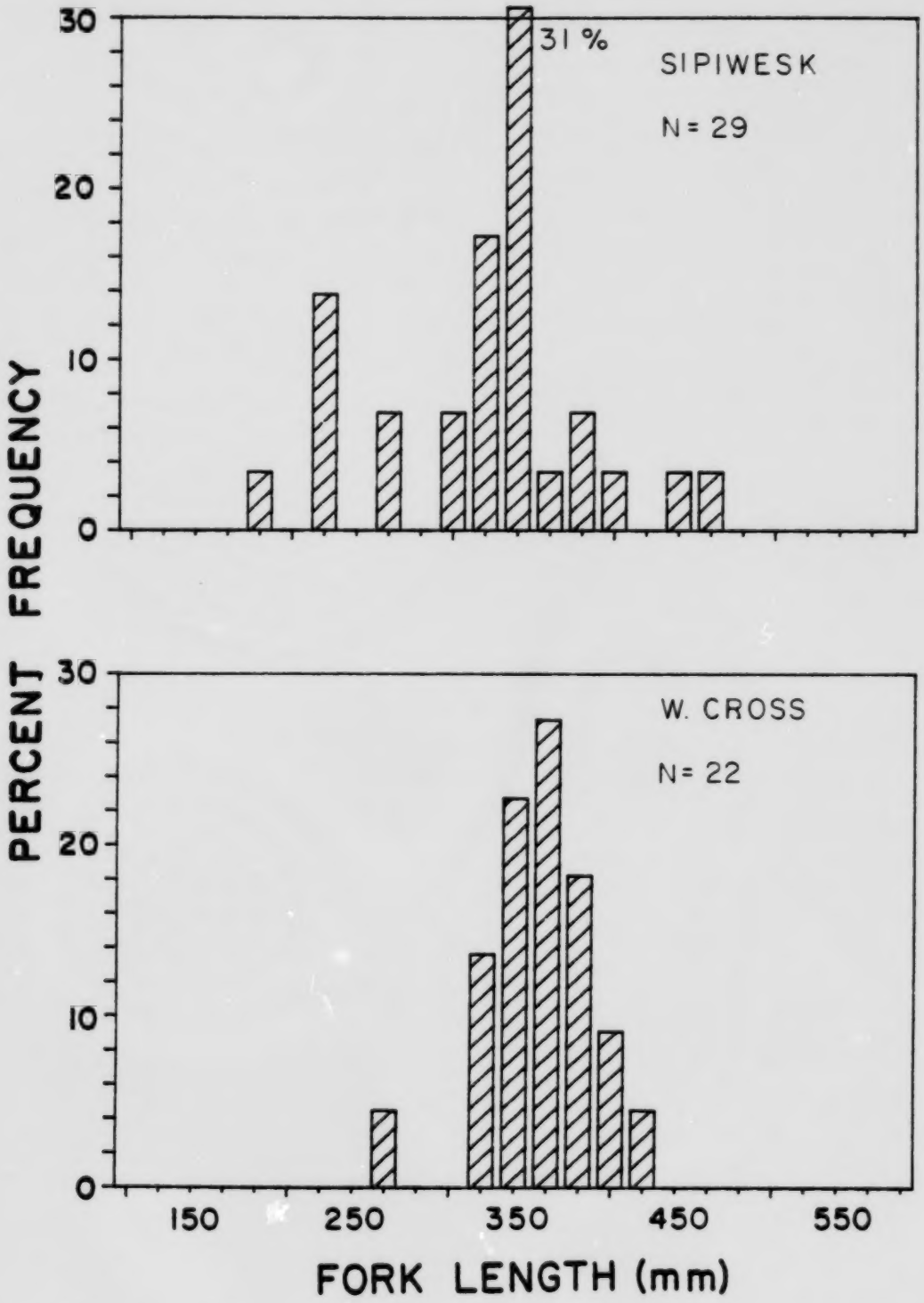

Fig. 20. Fork length frequencies for shorthead redhorse sucker from Sipiwesk and West Cross lakes, 1989.

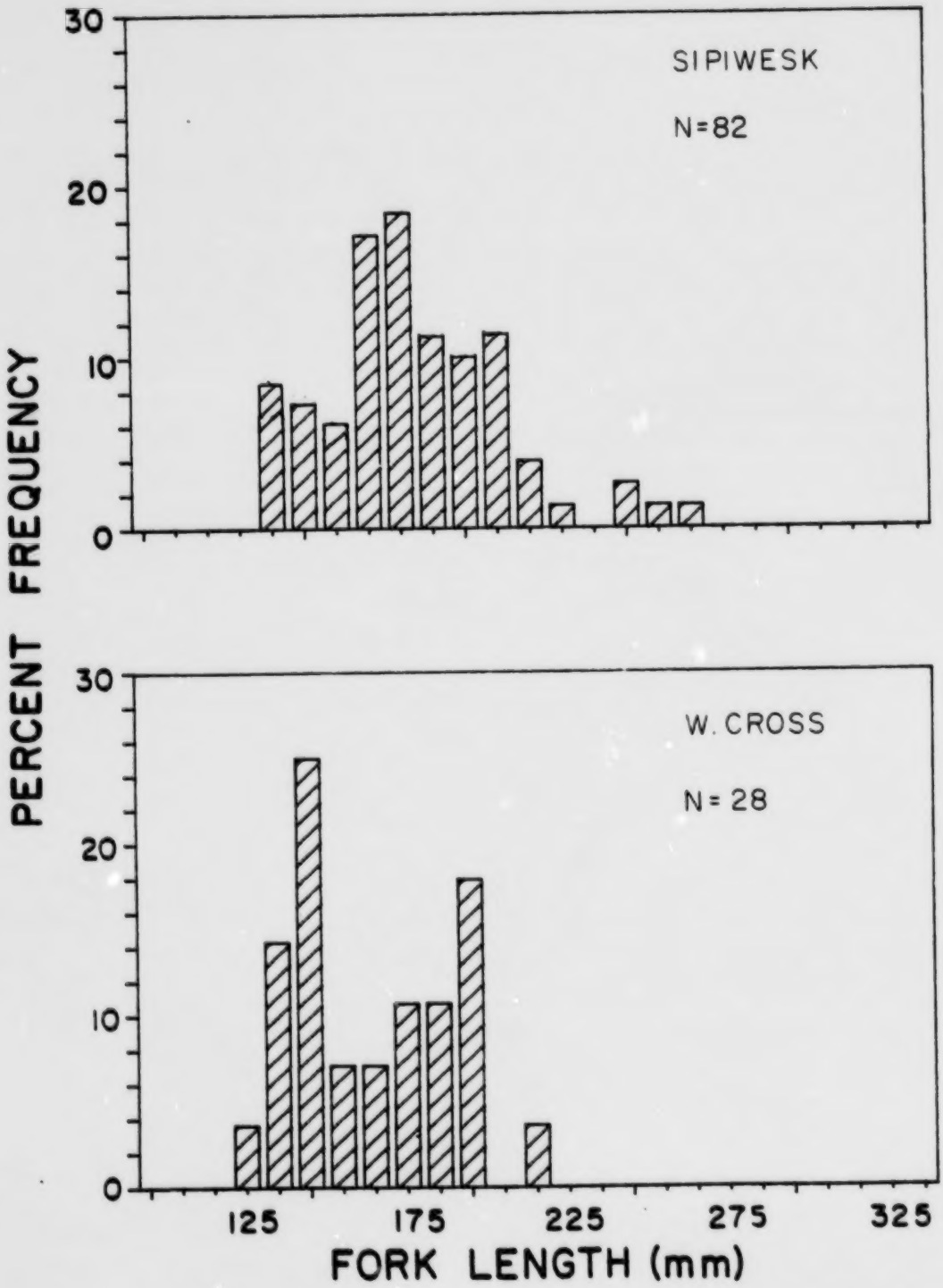

Fig. 21. Fork length frequencies for yellow perch from Sipiwesk and West Cross lakes, 1989.

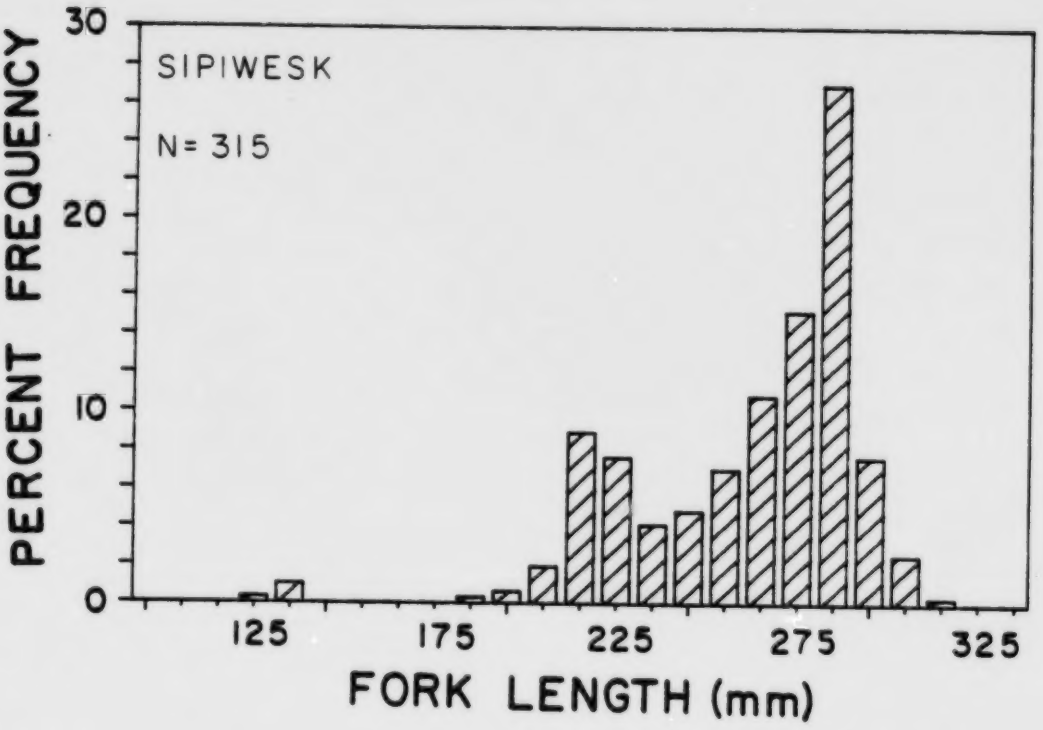

Fig. 22. Fork length frequencies for mooneye from Sipiwesk Lake, 1989.

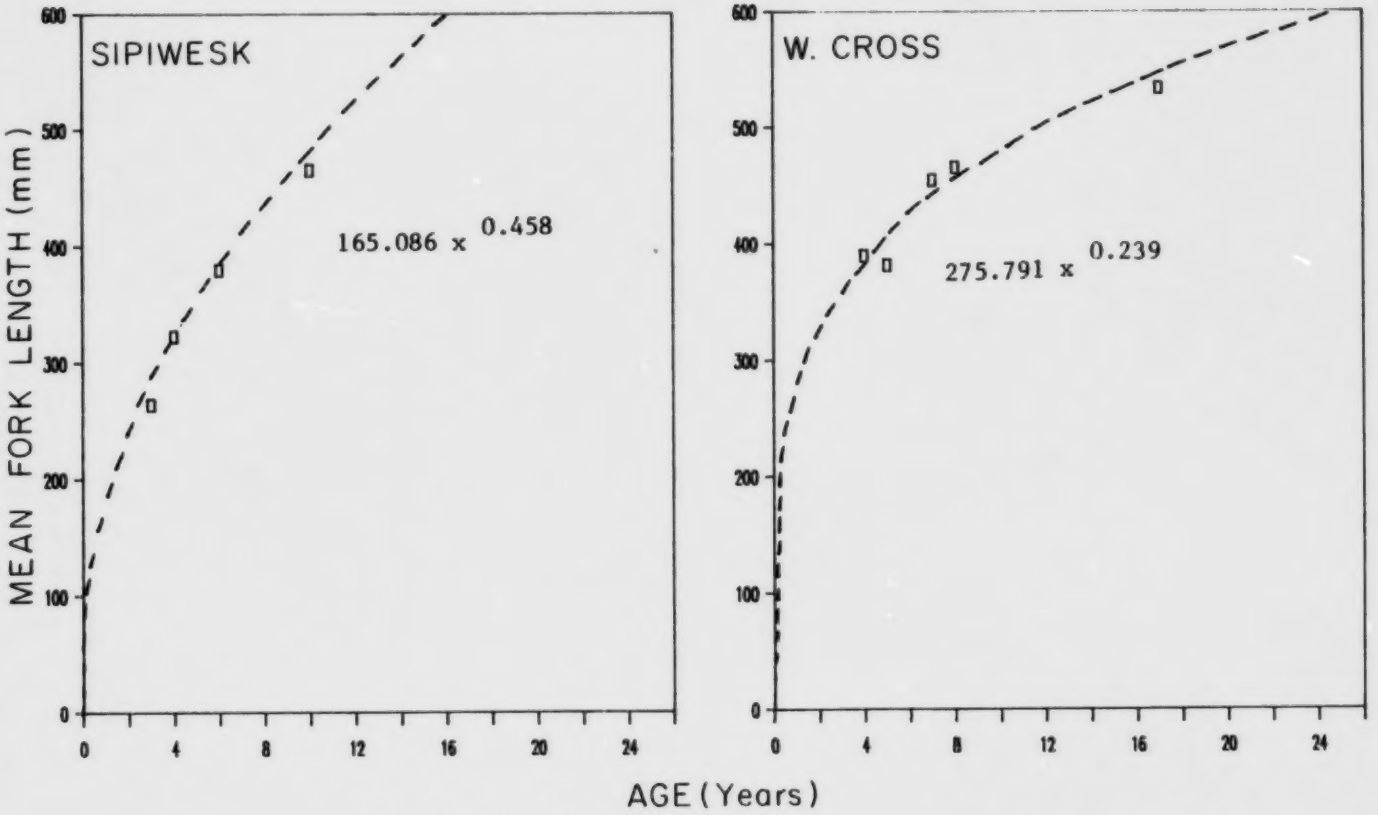

Fig. 23. Growth curves (--- = least squares regression power curve) for whitefish from Sipiwesk and West Cross lakes, 1989.

N.B. insufficient data for von Bertallanfy analysis.

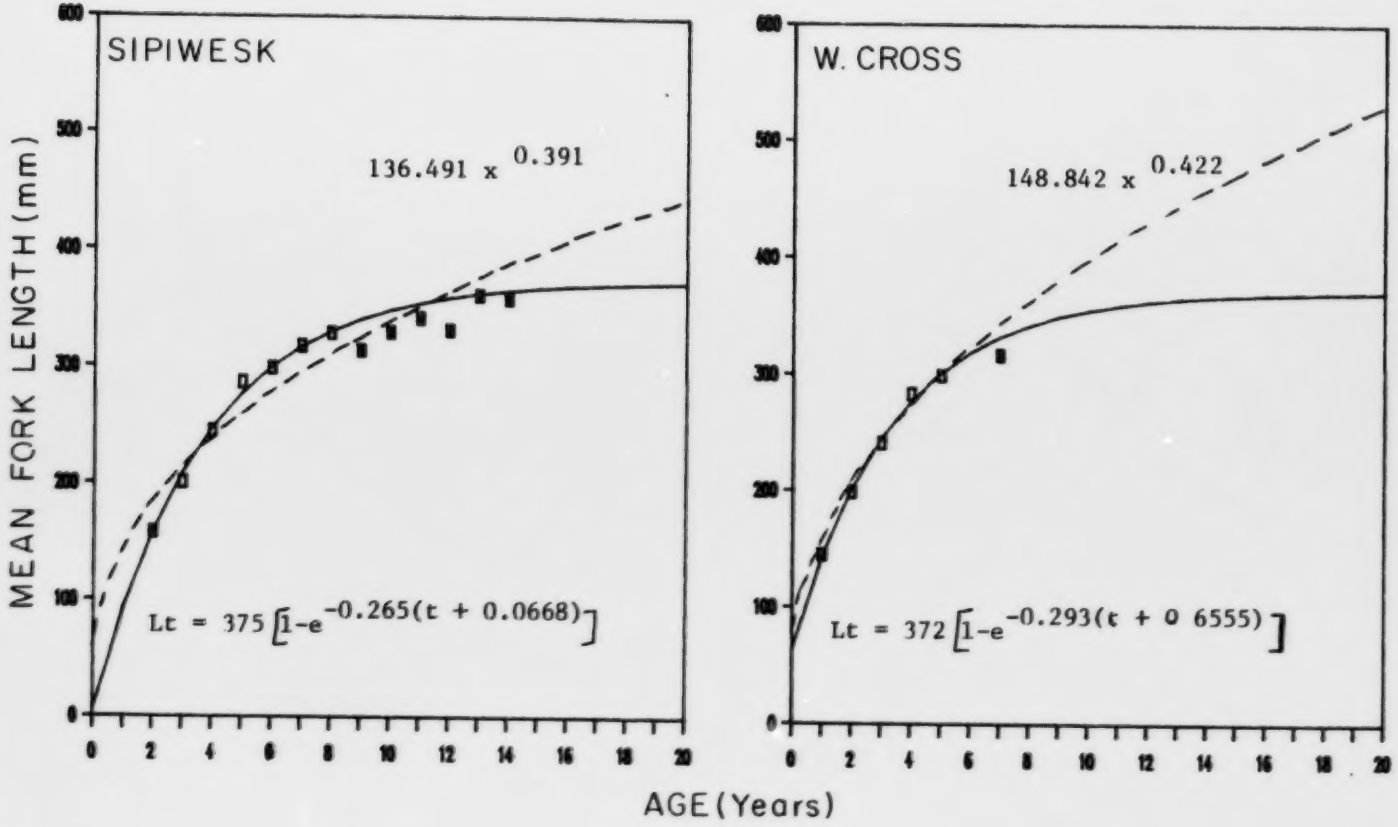

Fig. 24. Growth curves (___ = von Bertallanfy; --- = least squares regression power curve) for cisco from Sipiwesk and West Cross lakes, 1989.

■ = excluded from Walford and Brody analysis.

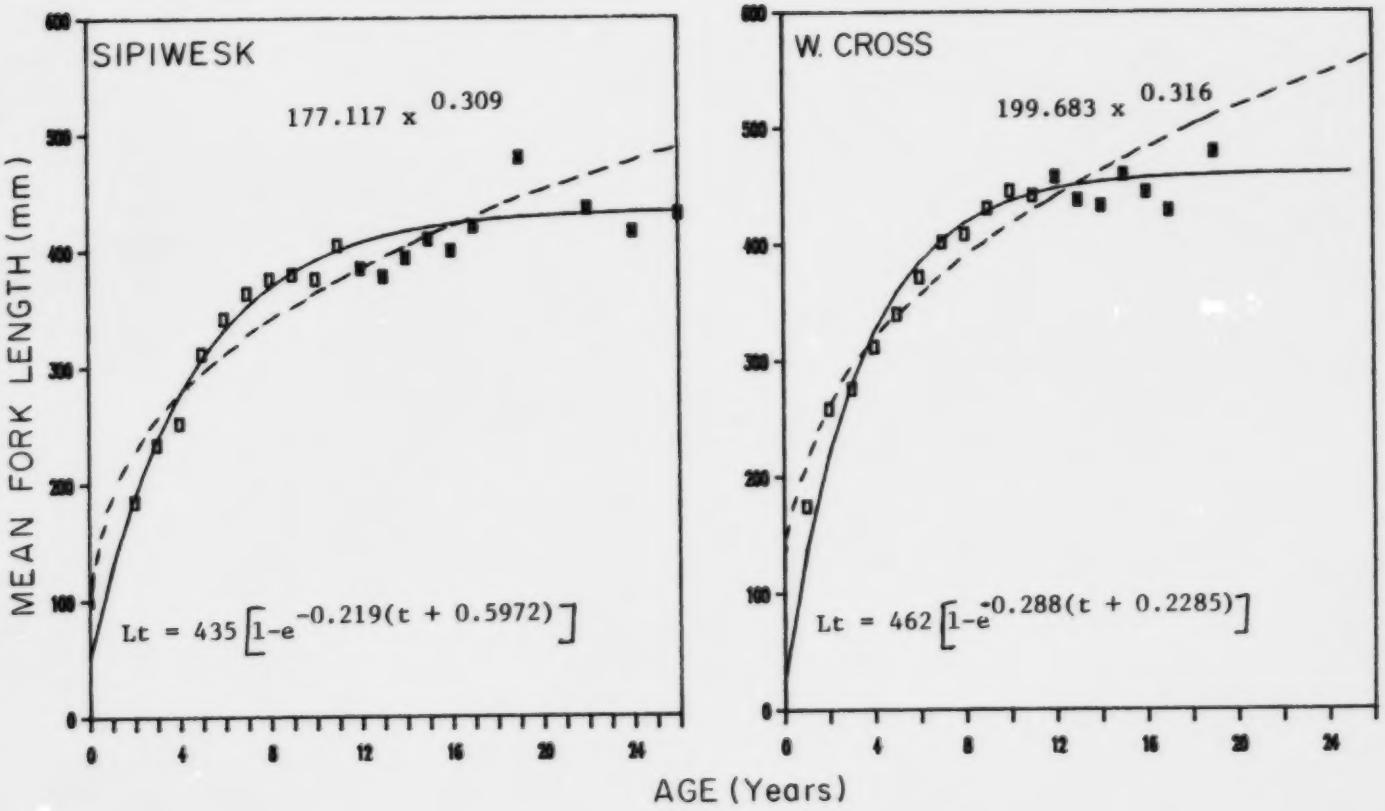

Fig. 25. Growth curves (___ = von Bertallanfy; --- = least squares regression power curve) for walleye from Sipiwesk and West Cross lakes, 1989.

■ = excluded from Walford and Brody analysis.

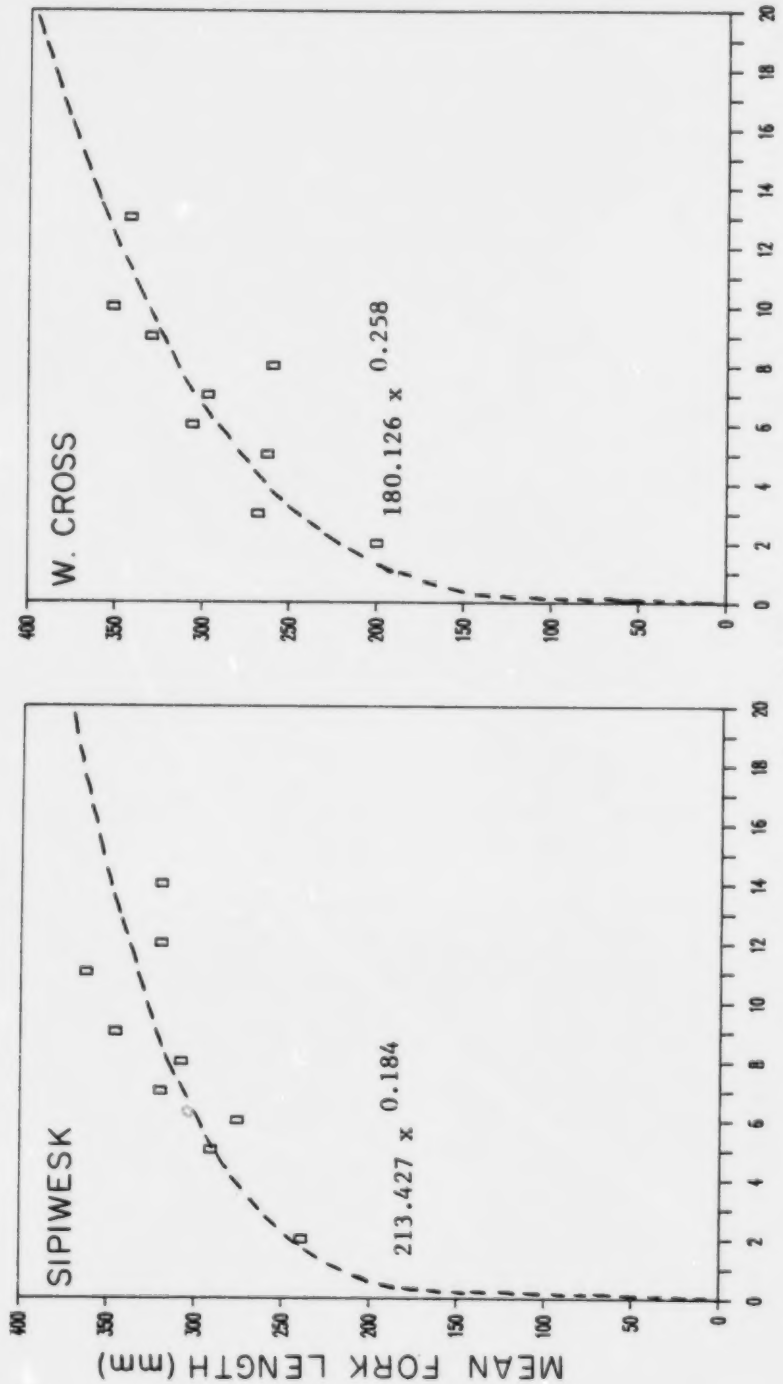

Fig. 26. Growth curves (--- = least squares regression power curve) for sauger from Sipiwesk and West Cross lakes, 1989.
N.B. Insufficient data for von Bertallanfy analysis.

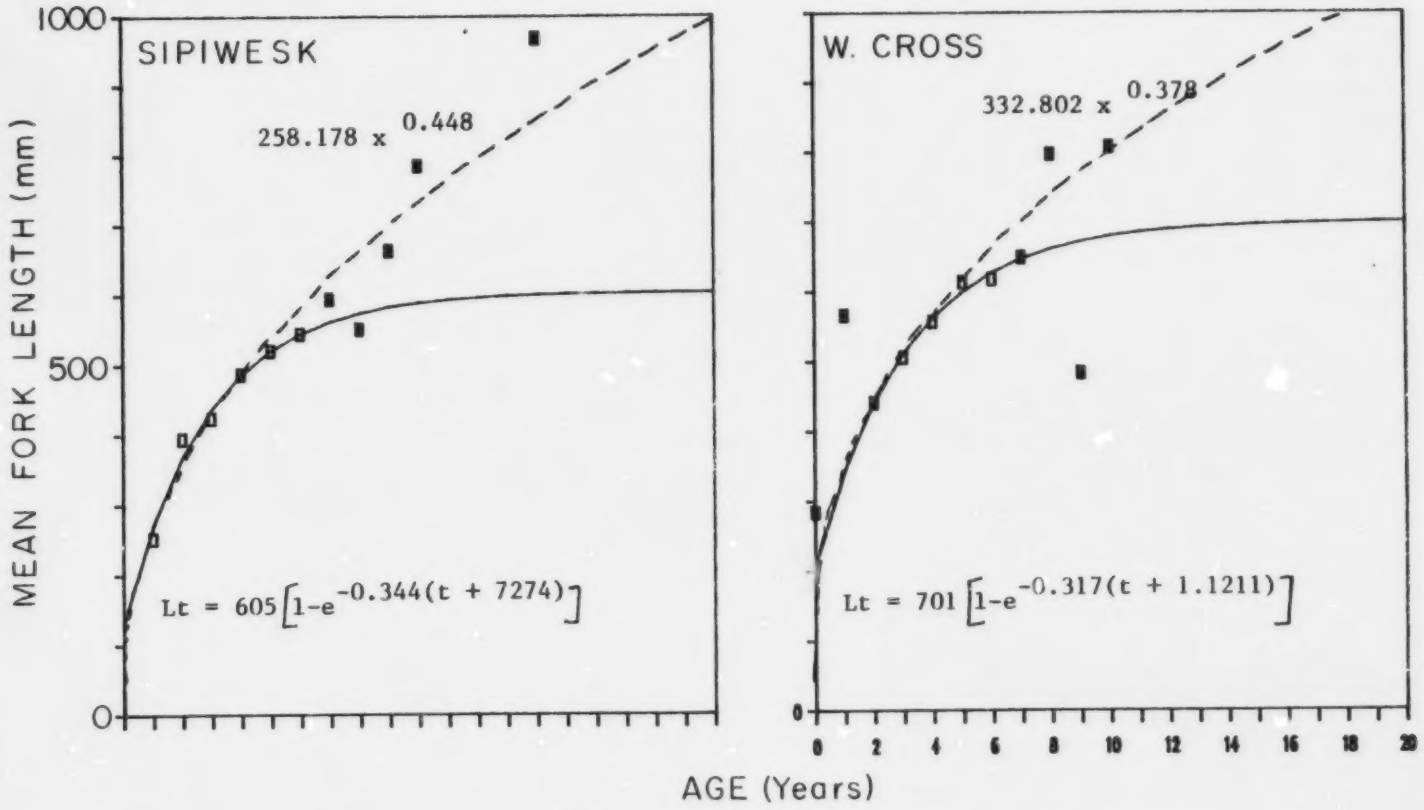

Fig. 27. Growth curves (___ = von Bertallanfy; --- = least squares regression power curve) for northern pike from Sipiwesk and West Cross lakes, 1989.

■ = excluded from Walford and Brody analysis.
N.B. ages 0, 1 and 9 were omitted for West Cross regression analysis.

Table 1. Catch summary for experimental fishing sets from Sipiwesk Lake, June 12 - July 1, 1989.

Set no.	Date of set	Whitefish	Cisco	Walleye	Sauger	Northern pike	White sucker	Longnose sucker	Shorthead redhorse sucker	Mooneye	Goldeye	Yellow perch	Burbot	Freshwater drum	Total
1	June 12			7	3	8	1		1	9	1	4			34
2	"	1		3	1	1	7			2		1			16
3	June 13			28		5	10		1	19				1	64
4	"			19		9	26		10	4	1	4			73
5	"			10		13	8			1					32
6	"			27		4	24	3	2	17		3			80
7	June 14		4	20	1	4	10			10					49
8	"			7	1	4	10		3	1		4			30
9	"		1	7		9	3				1	1	1		23
10	"			10	1	3	16			4		2			36
11	June 15		11	3	3	8	12					3			40
12	"		1	3		4	12		1		1	1			23
13	"		1	2		8	6								17
14	"			1	2	3	12				4	2			24
15	June 16				10	10	4					2			26
16	"		1	7	1	6	11				2	4			32
17	"		12	1	1	6	1					5			26
18	"	1	2			2	10		1						16
19	June 17	2	2	1		4	9					6			24
20	"			4	3	5	10		2	3		2		1	30
21	June 27		8	9		13	13		1	15					59
22	"		5	4		7	1		1	4					22
23	"		4	5		11	3			4		4			31
24	"			5		7	2		1	23					38
25	June 28					46						3			49
26	"		7	2		19	2					3			33
27	"		1	2		15	8		1			7			34
28	"		8			13	6		1	1		10			39
29	June 29		9	1		8	6					2			26
30	"		3			15	14					3			35
31	"		3			7	2								12
32	"	1	3	1		7	2					4			18
33	June 30		3	6		3	11			8					31
34	"		4	7		4	8		1	4		1			29
35	"	1	1	7	4	1	19			2		1			36
36	"	2	2	9	1	2	20		1	2					39
37	July 1			22	1	3	1			122					149
38	"			1		1	4		1	1					8
39	"		2	15		2	27			56					102
40	"		2	6	1		10			3					22
	Total	8	100	262	34	300	361	3	29	315	10	82	1	2	1507

Table 2. Catch summary for experimental fishing sets from West Cross Lake, August 9 - August 23, 1989.

Set no.	Date of set	Whitefish	Cisco	Walleye	Sauger	Northern pike	White sucker	Shorthead redhorse sucker	Mooneye	Goldeye	Yellow perch	Total
1	August 9			16	5	3	3	3				30
2	"			5	5		2	1		1	6	20
3	August 10	2	7	11		8						28
4	"		10	7		23	10				6	56
5	August 11	4	32	8		20	10				4	78
6	"	3	10	4		14	2				2	35
7	"	2	30	7		19	6				4	68
8	August 22			2		7	4	5	1			19
9	"			10		2	4	1			2	19
10	August 23			9	2	6	11	5	3			36
11	"			1		1	3	1				6
12	August 24			8	3	2	6	3	9		3	34
13	August 21			113		9		1			1	124
14	August 22			19		9	1					29
15	August 23			102		9	4	2		2		119
16	"			69		6	6					81
	Total	11	89	391	15	138	72	22	13	3	28	782

Table 3. Catch per unit effort (CUE) and percent frequency of occurrence for fish caught from Sipiwesk and West Cross lakes, 1989. Number in parentheses are the number of standard gangs set in each lake.

Species	CUE (number/gang/day)		CUE (kg/gang/day)		% frequency of occurrence			
	Sipiwesk (40)	W. Cross (16)	Sipiwesk	W. Cross	Sipiwesk No.	Sipiwesk Wt.	W. Cross No.	W. Cross Wt.
Whitefish	0.2	0.7	0.2	1.0	0.5	0.9	1.4	2.6
Cisco	2.5	5.6	0.6	1.4	6.6	2.8	11.4	3.8
Walleye	6.6	24.4	3.1	18.6	17.4	13.4	50.0	49.5
Sauger	0.9	0.9	0.2	0.2	2.3	1.0	1.9	0.6
Northern pike	7.5	8.6	7.6	11.5	19.9	32.8	17.6	30.7
White sucker	9.0	4.5	8.7	3.3	24.0	37.3	9.2	8.9
Longnose sucker	0.1		0.1		0.2	0.2		
Shorthead redhorse	0.7	1.4	0.5	1.1	1.9	2.0	2.8	3.0
Mooneye	7.9	0.8	1.9	0.2	20.9	8.0	1.7	0.6
Goldeye	0.3	0.2	0.1	0.1	0.7	0.4	0.4	0.1
Yellow perch	2.1	1.8	0.2	0.1	5.4	0.7	3.6	0.3
Burbot	0.03		<0.01		0.1	0.02		
Freshwater drum	0.1		0.1		0.1	0.4		
Total	37.7	48.9	23.4	37.5	100.0	100.0	100.0	100.0

Table 4. Sum weights (kg) for fish caught in 40 experimental fishing sets in Sipiwest Lake, 1989.

Species	Parameter	Mesh size (inches)						
		1.5	2.0	3.0	3.75	4.25	5.0	Total
Whitefish	N		1	2		2	3	8
	weights		0.25	1.94		3.14	3.31	8.65
Cisco	N	30	35	20	8	5	2	100
	weights	2.24	6.35	7.93	4.06	3.42	2.08	26.09
Walleye	N	53	60	78	62	6	3	262
	weights	8.57	23.28	43.51	40.32	6.19	2.87	124.74
Sauger	N	7	20	6	1			34
	weights	1.32	4.95	2.23	0.51			9.01
Northern pike	N	48	84	108	53	5	2	300
	weights	35.66	79.30	117.12	66.19	6.70	1.71	306.68
White sucker	N	10	44	54	143	55	55	361
	weights	1.59	12.51	41.78	144.25	67.70	80.83	348.66
Longnose sucker	N		2		1			3
	weights		1.24		0.91			2.15
Shorthead redhorse sucker	N	3	9	11	3		3	29
	weights	1.46	3.51	6.21	3.15		4.30	18.62
Mooneye	N	25	111	140	36	1	2	315
	weights	4.15	22.15	37.37	10.66	0.34	0.44	75.11
Goldeye	N	1	1	6		1	1	10
	weights	0.48	0.25	2.69		0.29	0.29	4.01
Yellow perch	N	38	37	5	1		1	82
	weights	2.08	3.50	0.94	0.12		0.13	6.78
Burbot	N		1					1
	weights		0.16					0.16
Freshwater drum	N	1					1	2
	weights	2.26					1.24	3.50
Total	N	216	405	430	308	75	73	1507
	weights	59.82	157.45	261.73	270.17	87.78	97.21	934.16

Table 5. Sum weights (kg) for fish caught in 16 experimental fishing sets in West Cross Lake, 1989.

Species	Parameter	Mesh size (inches)							
		1.5	2.0	3.0	3.75	4.25	5.0	5.25	Total
Whitefish	N			2	3	1	5		11
	weights			2.42	3.77	1.54	7.71		15.44
Cisco	N	9	32	27	14	5	2		89
	weights	0.42	5.34	8.36	5.46	1.88	1.04		22.50
Walleye	N	17	40	146	123	55	7	3	391
	weights	6.62	23.32	100.47	96.78	55.52	9.95	4.17	296.83
Sauger	N	3	9	3					15
	weights	0.70	1.78	1.22					3.70
Northern pike	N	17	37	43	33	7		1	138
	weights	21.19	39.40	53.57	53.42	13.85		2.89	184.32
White sucker	N	8	21	5	14	16	5	3	72
	weights	0.58	4.31	4.17	12.65	19.26	7.44	4.78	53.19
Shorthead redhorse sucker	N	3	1	8	8	2			22
	weights	2.02	1.20	6.48	6.24	1.79			17.73
Mooneye	N		4	5	3	1			13
	weights		0.57	1.52	1.02	0.36			3.47
Goldeye	N		2	1					3
	weights		0.44	0.38					0.82
Yellow perch	N	17	11						28
	weights	0.82	1.05						1.87
Total	N	74	157	240	198	87	19	7	782
	weights	32.35	77.40	178.59	179.33	94.20	26.14	11.84	599.86

Table 6. Mesh size effects on whitefish catches from Sipiwesk Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught		1	2		2	3	8
CUE (No/100 yds/day)		0.10	0.20		0.20	0.30	0.13
CUE (Kg/100 yds/day)		0.03	0.19		0.31	0.33	0.14
Mean Length(mm)		256 ± -	354 ± 127.28		421 ± 125.87	401 ± 36.95	376 ± 89.53
Mean Weight(g)		252 ± -	972 ± 987.12		1571 ±1426.94	1103 ± 309.89	1081 ± 792.40
No. mat. males			1		1	1	3
No. immat. males		1	1				2
No. mat. females					1	2	3
No. immat. females							
% mature (both)			50.0		100.0	100.0	75.0
No. unknown							
Mean age (Years)		4.0	6.5		7.0	6.7	6.4
Age(years)				Frequency (%)			
3		0.0	50.0		0.0	0.0	12.5
4		100.0	0.0		50.0	33.3	37.5
6		0.0	0.0		0.0	33.3	12.5
10		0.0	50.0		50.0	33.3	37.5

Total effort for each mesh size was 1000 yards of net.
± = standard deviation

Table 7. Mesh size effects on whitefish catches from West Cross Lake, 1989.

	Mesh size (inches)							
	1.50	2.00	3.00	3.75	4.25	5.00	5.25	Total
Number caught			2	3	1	5		11
CUE (No/100 yds/day)			0.50	0.75	0.25	1.25		0.39
CUE (Kg/100 yds/day)			0.61	0.94	0.39	1.93		0.55
Mean Length(mm)			420 ± 50.91	433 ± 51.32	460 ± -	459 ± 54.98		445 ± 47.74
Mean Weight(g)			1210 ± 523.26	1256 ± 571.78	1540 ± -	1542 ± 647.25		1404 ± 534.66
No. mat. males			2	2	1	1		6
No. immat. males								
No. mat. females				1		4		5
No. immat. females								
% mature (both)			100.0	100.0	100.0	100.0		100.0
No. unknown								
Mean age (Years)			6.0	6.0	7.0	9.0		7.5
Age(years)	Frequency (%)							
4				33.3				9.1
5			50.0			20.0		18.2
7			50.0	66.7	100.0	20.0		45.5
8						40.0		18.2
17						20.0		9.1

Total effort for each mesh size was 400 yards of net.

Table 8. Mesh size effects on cisco catches from Sipiwesk Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	30	35	20	8	5	2	100
CUE (No/100 yds/day)	3.00	3.50	2.00	0.80	0.50	0.20	1.67
CUE (Kg/100 yds/day)	0.22	0.64	0.79	0.41	0.34	0.21	0.43
Mean Length(mm)	173 ± 33.55	223 ± 44.41	287 ± 36.72	313 ± 30.07	332 ± 32.45	385 ± 32.53	237 ± 67.45
Mean Weight(g)	75 ± 63.04	181 ± 146.07	397 ± 176.85	508 ± 160.12	685 ± 180.14	1042 ± 294.16	261 ± 247.51
No. mat. males	8	15	7	3	2	1	36
No. immat. males	8	4					12
No. mat. females	10	14	13	5	3	1	46
No. immat. females	4	2					6
% mature (both)	60.0	82.9	100.0	100.0	100.0	100.0	82.0
No. unknown							
Mean age (Years)	2.5	3.6	6.6	7.4	9.2	12.0	4.6
Age(years)	Frequency (%)						
2	63.3	8.6					22.0
3	33.3	51.4	5.0				29.0
4		22.9	30.0	12.5			15.0
5		8.6	25.0	37.5	20.0		12.0
6	3.3	2.9	5.0				3.0
7		5.7	5.0				3.0
8			5.0	12.5	20.0		3.0
9			5.0				1.0
10				25.0	40.0	50.0	5.0
11			5.0				1.0
12			5.0	12.5			2.0
13			5.0		20.0		2.0
14			5.0			50.0	2.0

Total effort for each mesh size was 1000 yards of net.
± = standard deviation

Table 9. Mesh size effects on cisco catches from West Cross Lake, 1989.

	Mesh size (inches)							
	1.50	2.00	3.00	3.75	4.25	5.00	5.25	Total
Number caught	9	32	27	14	5	2		89
CUE (No/100 yds/day)	2.25	8.00	6.75	3.50	1.25	0.50		3.18
CUE (Kg/100 yds/day)	0.10	1.34	2.09	1.37	0.47	0.26		0.80
Mean Length(mm)	150 ± 18.19	224 ± 22.38	271 ± 28.23	294 ± 28.57	281 ± 72.95	322 ± 45.25		247 ± 52.07
Mean Weight(g)	46 ± 22.70	167 ± 53.51	309 ± 102.58	390 ± 98.61	375 ± 206.56	521 ± 202.23		253 ± 146.73
No. mat. males	1	12	13	11	3	1		41
No. immat. males	3				1			4
No. mat. females	5	19	14	3	1	1		43
No. immat. females		1						1
% mature (both)	66.7	96.9	100.0	100.0	80.0	100.0		94.4
No. unknown								
Mean age (Years)	1.1	2.7	4.0	5.2	5.0	6.0		3.5
Age(years)	Frequency (%)							
1	88.9				20.0			10.1
2	11.1	34.4						13.5
3		62.5	55.6	14.3				41.6
4		3.1	7.4	7.1				4.5
5			25.9	50.0	40.0	50.0		19.1
7			11.1	28.6	40.0	50.0		11.2

Total effort for each mesh size was 400 yards of net.
± = standard deviation

Table 10. Mesh size effects on walleye catches from Sipiwesk Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	53	60	78	62	6	3	262
CUE (No/100 yds/day)	5.30	6.00	7.80	6.20	0.60	0.30	4.37
CUE (Kg/100 yds/day)	0.86	2.33	4.35	4.03	0.62	0.29	2.08
Mean Length(mm)	219 ± 79.77	317 ± 65.64	366 ± 34.40	386 ± 22.35	437 ± 31.99	442 ± 33.05	332 ± 82.52
Mean Weight(g)	162 ± 205.89	388 ± 208.15	558 ± 165.56	650 ± 115.61	1031 ± 229.37	957 ± 107.86	476 ± 267.14
No. mat. males	4	11	39	31	1	1	87
No. immat. males	23	12	8	1			44
No. mat. females	3	12	15	27	5	2	64
No. immat. females	23	25	16	3			67
% mature (both)	13.2	38.3	69.2	93.5	100.0	100.0	57.6
No. unknown							
Mean age (Years)	3.5	6.6	8.9	11.2	13.8	19.0	8.0
Age(years)	Frequency (%)						
2	73.6	16.7					18.7
3	3.8	11.7					3.4
4	1.9						0.4
5	1.9	8.3	3.8				3.4
6	3.8	28.3	25.6	4.8			16.0
7		3.3	3.8	4.8			3.1
8	3.8	10.0	28.2	17.7	16.7		16.0
9		1.7	3.8	9.7			3.8
10	3.8	3.3	12.8	12.9	33.3		9.2
11	3.8	3.3	1.3	3.2			2.7
12	3.8	3.3	5.1	16.1		33.3	7.3
13		3.3	6.4	6.5	16.7		4.6
14		1.7	3.8	6.5			3.1
15				6.5			1.5
16		3.3	3.8	8.1	16.7		4.2
17		1.7		1.6			0.8
19						33.3	0.4
22			1.3				0.4
24				1.6			0.4
26					16.7	33.3	0.8

Total effort for each mesh size was 1000 yards of net.
± = standard deviation

Table 11. Mesh size effects on walleye catches from West Cross Lake, 1989.

	Mesh size (inches)							
	1.50	2.00	3.00	3.75	4.25	5.00	5.25	Total
Number caught	17	40	146	123	55	7	3	391
CUE (No/100 yds/day)	4.25	10.00	36.50	30.75	13.75	1.75	0.75	13.96
CUE (Kg/100 yds/day)	1.66	5.83	25.12	24.19	13.88	2.49	1.04	10.60
Mean Length(mm)	306 ± 87.86	364 ± 53.46	389 ± 37.93	407 ± 31.12	442 ± 29.53	490 ± 26.11	478 ± 14.00	398 ± 50.84
Mean Weight(g)	390 ± 259.41	583 ± 271.83	688 ± 206.67	787 ± 192.19	1010 ± 179.26	1421 ± 314.08	1390 ± 110.00	759 ± 273.23
No. mat. males	2	5	43	33	14	1		98
No. immat. males	7	22	39	33				101
No. mat. females	2	7	41	47	39	5	3	144
No. immat. females	6	6	23	10	2	1		48
% mature (both)	23.5	30.0	57.5	65.0	96.4	85.7	100.0	61.9
No. unknown								
Mean age (Years)	4.6	6.4	7.7	8.2	9.9	11.7	11.0	8.0
Age(years)	Frequency (%)							
1	23.5							1.0
2	11.8	2.5						0.8
3		5.0						0.5
4		2.5	0.7					0.5
5	11.8	25.0	10.3	3.3				7.9
6	35.3	42.5	33.6	23.6	1.8			26.1
7		2.5	6.8	5.7	3.6			5.1
8	17.6	10.0	27.4	42.3	30.9	14.3		29.9
9			3.4	4.1	14.5			4.6
10		2.5	12.3	12.2	32.7	57.1	66.7	14.8
11					1.8			0.3
12				0.8				0.3
13		2.5	0.7	4.1	3.6		33.3	2.6
14		5.0		0.8				0.8
15			0.7	0.8	3.6	14.3		1.3
16			0.7	0.8	5.5			1.3
17			2.7	0.8				1.3
19			0.7	0.8	1.8	14.3		1.0

Total effort for each mesh size was 400 yards of net.
± = standard deviation

Table 12. Mesh size effects on sauger catches from Sipiwesk Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	7	20	6	1			34
CUE (No/100 yds/day)	0.70	2.00	0.60	0.10			0.57
CUE (Kg/100 yds/day)	0.13	0.49	0.22	0.05			0.15
Mean Length(mm)	266 ± 33.59	298 ± 32.95	337 ± 12.11	372 ± -			300 ± 38.71
Mean Weight(g)	189 ± 68.06	247 ± 69.29	372 ± 31.67	510 ± -			265 ± 95.32
No. mat. males	2	9	2				13
No. immat. males	1						1
No. mat. females	3	10	4	1			18
No. immat. females	1	1					2
% mature (both)	71.4	95.0	100.0	100.0			91.2
No. unknown							
Mean age (Years)	5.6	6.6	9.3	11.0			7.0
Age(years)	Frequency (%)						
2	14.3	5.0					5.9
5		20.0					11.8
6	71.4	30.0					32.4
7	14.3	20.0	33.3				20.6
8		15.0	16.7				11.8
9		5.0	16.7				5.9
11			16.7	100.0			5.9
12		5.0					2.9
14			16.7				2.9

Total effort for each mesh size was 1000 yards of net.

Table 13. Mesh size effects on sauger catches from West Cross Lake, 1989.

	Mesh size (inches)							
	1.50	2.00	3.00	3.75	4.25	5.00	5.25	Total
Number caught	3	9	3					15
CUE (No/100 yds/day)	0.75	2.25	0.75					0.54
CUE (Kg/100 yds/day)	0.18	0.45	0.31					0.13
Mean Length(mm)	271 ± 73.06	274 ± 21.46	341 ± 11.02					287 ± 42.81
Mean Weight(g)	233 ± 180.25	198 ± 57.06	408 ± 38.63					247 ± 117.76
No. mat. males	1	2	3					6
No. immat. males	1	1						2
No. mat. females	1	4						5
No. immat. females		2						2
% mature (both)	66.7	66.7	100.0					73.3
No. unknown								
Mean age (Years)	3.7	6.1	10.7					6.5
Age(years)								
2	33.3							6.7
3	33.3							6.7
5		44.4						26.7
6	33.3	11.1						13.3
7		33.3						20.0
8		11.1						6.7
9			33.3					6.7
10			33.3					6.7
13			33.3					6.7

Total effort for each mesh size was 400 yards of net.
± = standard deviation

Table 14. Mesh size effects on northern pike catches from Sipiwesk Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	48	84	108	53	5	2	300
CUE (No/100 yds/day)	4.80	8.40	10.80	5.30	0.50	0.20	5.00
CUE (Kg/100 yds/day)	3.57	7.93	11.71	6.62	0.67	0.17	5.11
Mean Length(mm)	449 ± 104.22	490 ± 81.64	523 ± 72.19	558 ± 51.33	552 ± 88.65	509 ± 57.98	508 ± 84.81
Mean Weight(g)	743 ± 554.61	944 ± 492.32	1084 ± 699.69	1249 ± 401.38	1340 ± 689.24	853 ± 264.46	1022 ± 593.35
No. mat. males	21	43	41	14	2		121
No. immat. males	1						1
No. mat. females	18	38	64	39	3	1	163
No. immat. females	8	3	3			1	15
% mature (both)	81.3	96.4	97.2	100.0	100.0	50.0	94.7
No. unknown							
Mean age (Years)	3.9	4.4	5.3	5.7	5.2	4.0	4.9
Age(years)	Frequency (%)						
1	8.3	1.2					1.7
2	12.5	14.3	1.9				6.7
3	25.0	11.9	8.3			50.0	10.7
4	16.7	19.0	20.4	15.1	20.0		18.3
5	22.9	29.8	30.6	28.3	60.0	50.0	29.3
6	6.3	16.7	22.2	35.8			20.0
7	6.3	6.0	12.0	17.0	20.0		10.3
8		1.2	1.9	1.9			1.3
9			0.9	1.9			0.7
10	2.1		0.9				0.7
14			0.9				0.3

Total effort for each mesh size was 1000 yards of net.

Table 15. Mesh size effects on northern pike catches from West Cross Lake, 1989.

	Mesh size (inches)							
	1.50	2.00	3.00	3.75	4.25	5.00	5.25	Total
Number caught	17	37	43	33	7		1	138
CUE (No/100 yds/day)	4.25	9.25	10.75	8.25	1.75		0.25	4.93
CUE (Kg/100 yds/day)	5.30	9.85	13.39	13.36	3.46		0.72	6.58
Mean Length(mm)	554 ± 79.72	523 ± 97.67	553 ± 84.81	609 ± 69.13	663 ± 46.39		712 ± -	565 ± 91.28
Mean Weight(g)	1246 ± 551.60	1065 ± 575.78	1246 ± 867.95	1619 ± 650.72	1979 ± 608.53		2890 ± -	1336 ± 741.70
No. mat. males	5	9	15	11	1			41
No. immat. males		1						1
No. mat. females	12	23	27	22	5		1	90
No. immat. females		4	1		1			6
% mature (both)	100.0	86.5	97.7	100.0	85.7		100.0	94.9
No. unknown								
Mean age (Years)	4.5	3.6	4.3	4.9	5.0		7.0	4.3
Age(years)	Frequency (%)							
0		2.7						0.7
1		2.7			14.3			1.4
2	5.9	18.9	2.3	3.0				7.2
3	23.5	21.6	25.6	3.0	14.3			18.1
4	23.5	29.7	44.2	39.4	14.3			34.8
5	17.6	10.8	11.6	30.3				15.9
6	17.6	8.1	9.3	18.2	14.3			12.3
7	11.8	5.4	2.3		42.9		100.0	6.5
8			2.3	3.0				1.4
9			2.3					0.7
10				3.0				0.7

Total effort for each mesh size was 400 yards of net.
± = standard deviation

Table 16. Mesh size effects on white, longnose and shorthead redhorse sucker and freshwater drum catches from Sipiwesk Lake, 1989.

Species		Mesh size (inches)						
		1.50	2.00	3.00	3.75	4.25	5.00	Total
White sucker	Number caught	10	44	54	143	55	55	361
	CUE (No/100 yds/day)	1.00	4.40	5.40	14.30	5.50	5.50	6.02
	CUE (Kg/100 yds/day)	0.16	1.25	4.18	14.43	6.77	8.08	5.81
	Mean Length(mm)	190 ± 69.35	253 ± 55.57	359 ± 40.43	392 ± 38.09	419 ± 29.83	443 ± 21.58	376 ± 73.81
	Mean Weight(g)	159 ± 293.09	284 ± 233.95	774 ± 264.60	1009 ± 304.65	1231 ± 267.48	1470 ± 203.35	966 ± 450.73
Longnose sucker	Number caught		2		1			3
	CUE (No/100 yds/day)		0.20		0.10			0.05
	CUE (Kg/100 yds/day)		0.12		0.09			0.04
	Mean Length(mm)		376 ± 8.49		416 ± -			389 ± 23.86
	Mean Weight(g)		620 ± 70.71		910 ± -			717 ± 174.74
Shorthead redhorse sucker	Number caught	3	9	11	3		3	29
	CUE (No/100 yds/day)	0.30	0.90	1.10	0.30		0.30	0.48
	CUE (Kg/100 yds/day)	0.15	0.35	0.62	0.31		0.43	0.31
	Mean Length(mm)	311 ± 63.00	283 ± 71.37	327 ± 24.12	381 ± 71.28		417 ± 37.00	326 ± 65.04
	Mean Weight(g)	487 ± 246.87	390 ± 280.48	565 ± 133.24	1049 ± 734.02		1433 ± 388.50	642 ± 438.91
Freshwater drum	Number caught	1					1	2
	CUE (No/100 yds/day)	0.10					0.10	0.03
	CUE (Kg/100 yds/day)	0.23					0.12	0.06
	Mean Length(mm)	514 ± -					428 ± -	471 ± 60.81
	Mean Weight(g)	2260 ± -					1240 ± -	1750 ± 721.25

Total effort for each mesh was 1000 yards of net.
± = standard deviation

Table 17. Mesh size effects on mooneye, goldeye, yellow perch and burbot catches from Sipiwesk Lake, 1989.

Species		Mesh size (inches)						
		1.50	2.00	3.00	3.75	4.25	5.00	Total
Mooneye	Number caught	25	111	140	36	1	2	315
	CUE (No/100 yds/day)	2.50	11.10	14.00	3.60	0.10	0.20	5.25
	CUE (Kg/100 yds/day)	0.42	2.21	3.74	1.07	0.03	0.04	1.25
	Mean Length(mm)	226 ± 44.17	244 ± 32.09	274 ± 15.66	282 ± 12.70	290 ± -	255 ± 35.36	260 ± 31.09
	Mean Weight(g)	166 ± 82.22	200 ± 73.85	267 ± 39.85	296 ± 44.84	340 ± -	219 ± 91.92	238 ± 71.50
Goldeye	Number caught	1	1	6		1	1	10
	CUE (No/100 yds/day)	0.10	0.10	0.60		0.10	0.10	0.17
	CUE (Kg/100 yds/day)	0.05	0.03	0.27		0.03	0.03	0.07
	Mean Length(mm)	354 ± -	292 ± -	340 ± 19.45		304 ± -	298 ± -	329 ± 26.15
	Mean Weight(g)	484 ± -	254 ± -	448 ± 76.16		292 ± -	294 ± -	401 ± 102.14
Yellow perch	Number caught	38	37	5	1		1	82
	CUE (No/100 yds/day)	3.80	3.70	0.50	0.10		0.10	1.37
	CUE (Kg/100 yds/day)	0.21	0.35	0.09	0.01		0.01	0.11
	Mean Length(mm)	159 ± 17.63	187 ± 16.66	236 ± 37.20	208 ± -		208 ± -	178 ± 27.62
	Mean Weight(g)	55 ± 22.85	95 ± 26.08	189 ± 76.01	118 ± -		134 ± -	83 ± 44.73
Burbot	Number caught		1					1
	CUE (No/100 yds/day)		0.10					0.02
	CUE (Kg/100 yds/day)		0.02					0.00
	Mean Length(mm)		294 ± -					294 ± -
	Mean Weight(g)		160 ± -					160 ± -

Total effort for each mesh was 1000 yards of net.
± = standard deviation

Table 18. Mesh size effects on white sucker, shorthead redhorse sucker, mooneye, goldeye and yellow perch catches from West Cross Lake, 1989.

Species		Mesh size (inches)							
		1.50	2.00	3.00	3.75	4.25	5.00	5.25	Total
White sucker	Number caught	8	21	5	14	16	5	3	72
	CUE (No/100 yds/day)	2.00	5.25	1.25	3.50	4.00	1.25	0.75	2.57
	CUE (Kg/100 yds/day)	0.15	1.08	1.04	3.16	4.82	1.86	1.20	1.90
	Mean Length(mm)	165 ± 29.51	226 ± 55.88	367 ± 56.74	380 ± 21.72	416 ± 27.71	451 ± 27.04	442 ± 27.78	326 ± 107.51
	Mean Weight(g)	73 ± 39.32	205 ± 254.02	834 ± 391.96	903 ± 199.23	1204 ± 232.23	1488 ± 232.21	1593 ± 271.54	739 ± 556.82
Shorthead redhorse sucker	Number caught	3	1	8	8	2			22
	CUE (No/100 yds/day)	0.75	0.25	2.00	2.00	0.50			0.79
	CUE (Kg/100 yds/day)	0.50	0.30	1.62	1.56	0.45			0.63
	Mean Length(mm)	336 ± 55.46	410 ± -	366 ± 34.80	362 ± 22.56	372 ± 16.97			363 ± 33.17
	Mean Weight(g)	673 ± 300.67	1200 ± -	810 ± 270.10	780 ± 205.09	895 ± 91.92			806 ± 241.46
Mooneye	Number caught		4	5	3	1			13
	CUE (No/100 yds/day)		1.00	1.25	0.75	0.25			0.46
	CUE (Kg/100 yds/day)		0.14	0.38	0.26	0.09			0.12
	Mean Length(mm)		213 ± 50.66	281 ± 27.66	291 ± 12.86	280 ± -			262 ± 45.87
	Mean Weight(g)		142 ± 112.37	304 ± 82.43	340 ± 25.53	360 ± -			267 ± 115.59
Goldeye	Number caught		2	1					3
	CUE (No/100 yds/day)		0.50	0.25					0.11
	CUE (Kg/100 yds/day)		0.11	0.09					0.03
	Mean Length(mm)		257 ± 55.15	324 ± -					279 ± 54.93
	Mean Weight(g)		222 ± 138.59	376 ± -					273 ± 132.32
Yellow perch	Number caught	17	11						28
	CUE (No/100 yds/day)	4.25	2.75						1.00
	CUE (Kg/100 yds/day)	0.21	0.26						0.07
	Mean Length(mm)	146 ± 14.53	189 ± 10.93						163 ± 25.15
	Mean Weight(g)	48 ± 13.90	95 ± 15.71						67 ± 27.32

Total effort for each mesh was 400 yards of net.
± = standard deviation

Table 19. Age specific size and maturity conditions of whitefish from Sipiwesk Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
Males	3	1	0	0.0	264 ± -	274 ± -	1.49
	4	2	1	50.0	294 ± 53.74	407 ± 219.20	1.52
	6	1	1	100.0	380 ± -	900 ± -	1.64
	10	1	1	100.0	444 ± -	1670 ± -	1.91
Total		5	3	60.0	335 ± 79.37	732 ± 586.76	1.62
Females	4	1	1	100.0	380 ± -	950 ± -	1.73
	10	2	2	100.0	477 ± 46.67	2020 ± 791.96	1.81
Total		3	3	100.0	445 ± 65.00	1663 ± 833.81	1.78
Both	3	1	0	0.0	264 ± -	274 ± -	1.49
	4	3	2	66.7	323 ± 62.52	588 ± 349.73	1.59
	6	1	1	100.0	380 ± -	900 ± -	1.64
	10	3	3	100.0	466 ± 38.11	1903 ± 595.34	1.84
Total		8	6	75.0	376 ± 89.53	1081 ± 792.40	1.68

± = standard deviation

Table 20. Age specific size and maturity conditions of whitefish from West Cross Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ±	s.d.	Wt ±	s.d.	Mean Condition Factor
					(mm)		(g)		
Males	4	1	1	100.0	390 ±	-	808 ±	-	1.36
	5	1	1	100.0	384 ±	-	840 ±	-	1.48
	7	3	3	100.0	445 ±	22.03	1393 ±	289.37	1.56
	8	1	1	100.0	468 ±	-	1500 ±	-	1.46
Total		6	6	100.0	430 ±	36.97	1221 ±	360.59	1.50
Females	5	1	1	100.0	380 ±	-	762 ±	-	1.39
	7	2	2	100.0	469 ±	29.70	1595 ±	431.34	1.52
	8	1	1	100.0	464 ±	-	1620 ±	-	1.62
	17	1	1	100.0	534 ±	-	2540 ±	-	1.67
Total		5	5	100.0	463 ±	56.76	1622 ±	665.18	1.55
Both	4	1	1	100.0	390 ±	-	808 ±	-	1.36
	5	2	2	100.0	382 ±	2.83	801 ±	55.15	1.44
	7	5	5	100.0	455 ±	25.12	1474 ±	317.14	1.55
	8	2	2	100.0	466 ±	2.83	1560 ±	84.85	1.54
	17	1	1	100.0	534 ±	-	2540 ±	-	1.67
Total		11	11	100.0	445 ±	47.74	1404 ±	534.66	1.52

± = standard deviation

Table 21. Age specific size and maturity conditions of cisco from Sipiwesk Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
Males	2	11	3	27.3	155 ± 7.75	47 ± 9.18	1.23
	3	18	14	77.8	202 ± 21.92	111 ± 48.92	1.29
	4	5	5	100.0	240 ± 26.13	213 ± 81.16	1.47
	5	7	7	100.0	288 ± 18.58	393 ± 94.36	1.61
	6	1	1	100.0	310 ± -	446 ± -	1.50
	7	1	1	100.0	322 ± -	590 ± -	1.77
	8	1	1	100.0	328 ± -	620 ± -	1.76
	9	1	1	100.0	314 ± -	498 ± -	1.61
	10	3	3	100.0	341 ± 29.14	695 ± 151.13	1.73
Total		48	36	75.0	226 ± 62.34	220 ± 207.32	1.40
Females	2	11	7	63.6	161 ± 14.04	53 ± 17.38	1.24
	3	11	9	81.8	199 ± 27.09	115 ± 49.38	1.39
	4	10	10	100.0	248 ± 29.96	238 ± 91.65	1.48
	5	5	5	100.0	285 ± 25.40	370 ± 110.74	1.56
	6	2	2	100.0	293 ± 4.24	348 ± 25.46	1.38
	7	2	2	100.0	316 ± 42.43	531 ± 244.66	1.61
	8	2	2	100.0	329 ± 57.98	630 ± 347.90	1.67
	10	2	2	100.0	314 ± 8.49	575 ± 131.52	1.84
	11	1	1	100.0	342 ± -	778 ± -	1.94
	12	2	2	100.0	332 ± 45.25	625 ± 247.49	1.66
	13	2	2	100.0	362 ± 2.83	819 ± 57.98	1.73
	14	2	2	100.0	359 ± 69.30	808 ± 625.08	1.53
Total		52	46	88.5	246 ± 71.09	299 ± 276.22	1.47
Both	2	22	10	45.5	158 ± 11.41	50 ± 13.95	1.23
	3	29	23	79.3	201 ± 23.59	113 ± 48.24	1.33
	4	15	15	100.0	245 ± 28.01	229 ± 86.19	1.48
	5	12	12	100.0	287 ± 20.62	383 ± 97.22	1.59
	6	3	3	100.0	299 ± 10.26	381 ± 59.37	1.42
	7	3	3	100.0	318 ± 30.20	551 ± 176.32	1.67
	8	3	3	100.0	329 ± 41.00	627 ± 246.07	1.70
	9	1	1	100.0	314 ± -	498 ± -	1.61
	10	5	5	100.0	330 ± 25.82	647 ± 141.57	1.78
	11	1	1	100.0	342 ± -	778 ± -	1.94
	12	2	2	100.0	332 ± 45.25	625 ± 247.49	1.66
	13	2	2	100.0	362 ± 2.83	819 ± 57.98	1.73
	14	2	2	100.0	359 ± 69.30	808 ± 625.08	1.53
Total		100	82	82.0	237 ± 67.45	261 ± 247.51	1.44

± = standard deviation

Table 22. Age specific size and maturity conditions of cisco from West Cross Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
Males	1	4	0	0.0	147 ± 8.23	43 ± 8.08	1.36
	2	5	5	100.0	197 ± 7.56	107 ± 8.67	1.40
	3	18	18	100.0	243 ± 10.91	215 ± 29.96	1.49
	4	1	1	100.0	302 ± -	416 ± -	1.51
	5	10	10	100.0	300 ± 12.00	394 ± 47.35	1.45
	7	7	7	100.0	313 ± 20.32	461 ± 95.64	1.49
Total		45	41	91.1	254 ± 51.86	270 ± 144.11	1.46
Females	1	5	5	100.0	144 ± 5.90	38 ± 4.10	1.27
	2	7	6	85.7	201 ± 12.95	109 ± 21.51	1.33
	3	19	19	100.0	238 ± 17.62	202 ± 44.19	1.47
	4	3	3	100.0	277 ± 20.53	326 ± 68.09	1.53
	5	7	7	100.0	297 ± 9.44	417 ± 44.76	1.59
	7	3	3	100.0	328 ± 22.54	547 ± 104.08	1.54
Total		44	43	97.7	240 ± 51.83	235 ± 148.85	1.45
Both	1	9	5	55.6	145 ± 6.63	40 ± 6.23	1.31
	2	12	11	91.7	199 ± 10.80	108 ± 16.76	1.36
	3	37	37	100.0	241 ± 14.78	209 ± 38.03	1.48
	4	4	4	100.0	283 ± 21.01	349 ± 71.52	1.52
	5	17	17	100.0	299 ± 10.82	403 ± 46.30	1.51
	7	10	10	100.0	317 ± 21.06	487 ± 101.11	1.51
Total		89	84	94.4	247 ± 52.07	253 ± 146.73	1.46

± = standard deviation

Table 23. Age specific size and maturity conditions of walleye from Sipiwesk Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
Males	2	26	0	0.0	187 ± 24.00	70 ± 33.30	1.01
	3	4	0	0.0	252 ± 29.80	168 ± 53.69	1.03
	4	1	0	0.0	252 ± -	156 ± -	0.97
	5	5	0	0.0	311 ± 19.88	327 ± 70.56	1.08
	6	14	7	50.0	345 ± 20.31	472 ± 96.01	1.14
	7	3	3	100.0	356 ± 5.29	497 ± 21.94	1.10
	8	16	15	93.8	364 ± 31.59	487 ± 88.44	1.02
	9	7	7	100.0	376 ± 32.69	613 ± 139.31	1.14
	10	15	15	100.0	368 ± 16.25	583 ± 95.53	1.17
	11	1	1	100.0	400 ± -	670 ± -	1.05
	12	11	11	100.0	371 ± 10.20	583 ± 32.43	1.14
	13	8	8	100.0	373 ± 31.48	579 ± 151.66	1.09
	14	6	6	100.0	394 ± 11.20	674 ± 90.45	1.10
	15	2	2	100.0	406 ± 36.77	748 ± 214.96	1.10
	16	7	7	100.0	387 ± 13.06	675 ± 70.50	1.16
	17	1	1	100.0	370 ± -	556 ± -	1.10
	22	1	1	100.0	436 ± -	920 ± -	1.11
	24	1	1	100.0	416 ± -	782 ± -	1.09
	26	2	2	100.0	431 ± 7.07	1000 ± 169.71	1.24
Total		131	87	66.4	328 ± 79.34	454 ± 243.84	1.09
Females	2	23	0	0.0	183 ± 22.01	63 ± 25.59	1.00
	3	5	0	0.0	220 ± 12.92	113 ± 16.53	1.06
	5	4	0	0.0	313 ± 23.91	323 ± 57.49	1.05
	6	28	4	14.3	341 ± 28.05	461 ± 125.56	1.13
	7	5	2	40.0	369 ± 46.79	577 ± 209.30	1.11
	8	26	19	73.1	384 ± 28.64	636 ± 176.78	1.10
	9	3	3	100.0	388 ± 2.00	627 ± 24.85	1.07
	10	9	8	88.9	390 ± 17.27	664 ± 120.03	1.11
	11	6	6	100.0	406 ± 8.00	704 ± 27.86	1.05
	12	8	8	100.0	403 ± 27.56	748 ± 164.34	1.13
	13	4	4	100.0	389 ± 31.30	715 ± 177.47	1.20
	14	2	2	100.0	393 ± 1.41	726 ± 0.00	1.20
	15	2	2	100.0	414 ± 5.66	774 ± 22.63	1.09
	16	4	4	100.0	423 ± 43.89	884 ± 331.57	1.13
	17	1	1	100.0	472 ± -	1140 ± -	1.08
	19	1	1	100.0	480 ± -	1080 ± -	0.98
Total		131	64	48.9	336 ± 85.68	498 ± 287.77	1.09
Both	2	49	0	0.0	185 ± 22.97	67 ± 29.84	1.00
	3	9	0	0.0	234 ± 26.61	137 ± 45.43	1.05
	4	1	0	0.0	252 ± -	156 ± -	0.97
	5	9	0	0.0	312 ± 20.32	325 ± 61.12	1.07
	6	42	11	26.2	342 ± 25.52	464 ± 115.48	1.14
	7	8	5	62.5	364 ± 36.13	547 ± 163.95	1.11
	8	42	34	81.0	376 ± 31.08	579 ± 165.25	1.07
	9	10	10	100.0	380 ± 27.29	617 ± 114.56	1.12
	10	24	23	95.8	376 ± 19.61	613 ± 110.23	1.14
	11	7	7	100.0	405 ± 7.65	699 ± 28.49	1.05
	12	19	19	100.0	385 ± 24.52	652 ± 134.50	1.14
	13	12	12	100.0	378 ± 30.89	624 ± 166.32	1.12
	14	8	8	100.0	394 ± 9.50	687 ± 80.14	1.12
	15	4	4	100.0	410 ± 21.97	761 ± 125.69	1.10
	16	11	11	100.0	400 ± 31.74	751 ± 217.02	1.15
	17	2	2	100.0	421 ± 72.12	848 ± 412.95	1.09
	19	1	1	100.0	480 ± -	1080 ± -	0.98
	22	1	1	100.0	436 ± -	920 ± -	1.11
	24	1	1	100.0	416 ± -	782 ± -	1.09
	26	2	2	100.0	431 ± 7.07	1000 ± 169.71	1.24
Total		262	151	57.6	332 ± 82.52	476 ± 267.14	1.09

± = standard deviation

Table 24. Age specific size and maturity conditions of walleye from West Cross Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± (mm)	s.d.	Wt ± (g)	s.d.	Mean Condition Factor
	1	1	0	0.0	166 ±	-	54 ±	-	1.18
Males	2	1	0	0.0	220 ±	-	116 ±	-	1.09
	3	2	0	0.0	276 ±	36.77	252 ±	101.82	1.16
	4	1	0	0.0	304 ±	-	282 ±	-	1.00
	5	20	2	10.0	340 ±	32.33	464 ±	125.19	1.15
	6	59	8	13.6	370 ±	17.55	587 ±	88.83	1.15
	7	12	4	33.3	387 ±	24.53	674 ±	133.36	1.15
	8	50	34	68.0	393 ±	21.74	705 ±	122.47	1.15
	9	10	9	90.0	413 ±	21.69	809 ±	138.21	1.14
	10	20	19	95.0	424 ±	28.01	927 ±	290.98	1.21
	12	1	1	100.0	458 ±	-	910 ±	-	0.95
	13	8	8	100.0	432 ±	38.37	957 ±	285.66	1.16
	14	1	1	100.0	414 ±	-	826 ±	-	1.16
	15	4	4	100.0	457 ±	32.43	1063 ±	228.93	1.11
	16	4	4	100.0	451 ±	12.79	1050 ±	25.82	1.15
	17	4	3	75.0	426 ±	14.55	860 ±	49.68	1.12
	19	1	1	100.0	438 ±	-	860 ±	-	1.02
Total		199	98	49.2	386 ±	43.48	688 ±	227.90	1.15
	1	3	0	0.0	177 ±	5.03	56 ±	5.29	1.00
Females	2	2	0	0.0	278 ±	0.00	230 ±	11.31	1.07
	4	1	1	100.0	320 ±	-	366 ±	-	1.12
	5	11	5	45.5	340 ±	17.78	441 ±	67.69	1.11
	6	43	20	46.5	374 ±	26.98	607 ±	130.34	1.14
	7	8	8	100.0	424 ±	20.13	908 ±	134.58	1.19
	8	67	57	85.1	421 ±	23.97	863 ±	156.63	1.15
	9	8	8	100.0	455 ±	26.44	1128 ±	245.33	1.19
	10	38	37	97.4	457 ±	29.69	1109 ±	266.23	1.15
	11	1	1	100.0	442 ±	-	920 ±	-	1.07
	13	2	2	100.0	463 ±	1.41	1250 ±	197.99	1.26
	14	2	1	50.0	443 ±	26.87	974 ±	291.33	1.10
	15	1	1	100.0	472 ±	-	1170 ±	-	1.11
	16	1	0	0.0	422 ±	-	880 ±	-	1.17
	17	1	1	100.0	442 ±	-	1020 ±	-	1.18
	19	3	2	66.7	494 ±	48.50	1057 ±	210.32	0.89
Total		192	144	75.0	411 ±	54.86	833 ±	296.54	1.14
	1	4	0	0.0	175 ±	7.00	56 ±	4.43	1.05
Both	2	3	0	0.0	259 ±	33.49	192 ±	66.30	1.08
	3	2	0	0.0	276 ±	36.77	252 ±	101.82	1.16
	4	2	1	50.0	312 ±	11.31	324 ±	59.40	1.06
	5	31	7	22.6	340 ±	27.70	456 ±	107.59	1.14
	6	102	28	27.5	372 ±	22.01	596 ±	108.16	1.15
	7	20	12	60.0	402 ±	28.86	767 ±	175.48	1.16
	8	117	91	77.8	409 ±	26.66	796 ±	162.76	1.15
	9	18	17	94.4	431 ±	31.56	951 ±	247.99	1.16
	10	58	56	96.6	446 ±	32.88	1046 ±	286.15	1.17
	11	1	1	100.0	442 ±	-	920 ±	-	1.07
	12	1	1	100.0	458 ±	-	910 ±	-	0.95
	13	10	10	100.0	438 ±	36.32	1016 ±	288.20	1.18
	14	3	2	66.7	433 ±	25.32	925 ±	223.02	1.12
	15	5	5	100.0	460 ±	28.93	1084 ±	203.95	1.11
	16	5	4	80.0	445 ±	16.89	1016 ±	79.25	1.16
	17	5	4	80.0	429 ±	14.60	892 ±	83.68	1.13
	19	4	3	75.0	480 ±	48.50	1008 ±	197.88	0.93
Total		391	242	61.9	398 ±	50.84	759 ±	273.23	1.15

± = standard deviation

Table 25. Age specific size and maturity conditions of sauger from Sipiwesk Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
Males	2	2	1	50.0	239 ± 1.41	126 ± 5.66	0.92
	5	2	2	100.0	280 ± 2.83	211 ± 4.24	0.96
	6	4	4	100.0	264 ± 31.03	193 ± 80.29	1.00
	7	4	4	100.0	314 ± 21.38	294 ± 74.35	0.94
	8	1	1	100.0	256 ± -	144 ± -	0.86
	14	1	1	100.0	320 ± -	318 ± -	0.97
Total		14	13	92.9	280 ± 34.33	220 ± 85.09	0.95
Females	5	2	2	100.0	302 ± 2.83	250 ± 11.31	0.91
	6	7	5	71.4	282 ± 37.66	212 ± 52.80	0.95
	7	3	3	100.0	329 ± 3.06	327 ± 20.82	0.92
	8	3	3	100.0	325 ± 18.58	322 ± 64.71	0.93
	9	2	2	100.0	346 ± 5.66	388 ± 11.31	0.94
	11	2	2	100.0	363 ± 12.73	453 ± 80.61	0.94
	12	1	1	100.0	320 ± -	316 ± -	0.96
Total		20	18	90.0	314 ± 36.07	296 ± 91.14	0.94
Both	2	2	1	50.0	239 ± 1.41	126 ± 5.66	0.92
	5	4	4	100.0	291 ± 12.91	231 ± 23.57	0.93
	6	11	9	81.8	276 ± 35.00	205 ± 60.86	0.97
	7	7	7	100.0	320 ± 17.41	308 ± 56.69	0.93
	8	4	4	100.0	308 ± 37.84	278 ± 103.50	0.91
	9	2	2	100.0	346 ± 5.66	388 ± 11.31	0.94
	11	2	2	100.0	363 ± 12.73	453 ± 80.61	0.94
	12	1	1	100.0	320 ± -	316 ± -	0.96
	14	1	1	100.0	320 ± -	318 ± -	0.97
Total		34	31	91.2	300 ± 38.71	265 ± 95.32	0.94

± = standard deviation

Table 26. Age specific size and maturity conditions of sauger from West Cross Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± (mm)	s.d.	Wt ± (g)	s.d.	Mean Condition Factor
Males	2	1	0	0.0	200 ±	-	76 ±	-	0.95
	3	1	1	100.0	268 ±	-	194 ±	-	1.01
	5	1	1	100.0	246 ±	-	140 ±	-	0.94
	6	1	1	100.0	266 ±	-	208 ±	-	1.11
	7	1	0	0.0	280 ±	-	186 ±	-	0.85
	9	1	1	100.0	330 ±	-	400 ±	-	1.11
	10	1	1	100.0	352 ±	-	450 ±	-	1.03
	13	1	1	100.0	342 ±	-	374 ±	-	0.93
Total		8	6	75.0	286 ±	52.35	254 ±	135.83	0.99
Females	5	3	1	33.3	268 ±	5.29	172 ±	8.00	0.90
	6	1	1	100.0	346 ±	-	430 ±	-	1.04
	7	2	2	100.0	306 ±	19.80	285 ±	60.81	0.99
	8	1	1	100.0	260 ±	-	160 ±	-	0.91
Total		7	5	71.4	289 ±	32.76	239 ±	103.48	0.94
Both	2	1	0	0.0	200 ±	-	76 ±	-	0.95
	3	1	1	100.0	268 ±	-	194 ±	-	1.01
	5	4	2	50.0	263 ±	11.82	164 ±	17.28	0.91
	6	2	2	100.0	306 ±	56.57	319 ±	156.98	1.07
	7	3	2	66.7	297 ±	20.53	252 ±	71.53	0.94
	8	1	1	100.0	260 ±	-	160 ±	-	0.91
	9	1	1	100.0	330 ±	-	400 ±	-	1.11
	10	1	1	100.0	352 ±	-	450 ±	-	1.03
	13	1	1	100.0	342 ±	-	374 ±	-	0.93
Total		15	11	73.3	287 ±	42.81	247 ±	117.76	0.97

± = standard deviation

Table 27. Age specific size and maturity conditions of northern pike from Sipiwesk Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
Males	1	1	0	0.0	236 ± -	104 ± -	0.79
	2	9	9	100.0	375 ± 24.98	393 ± 111.58	0.73
	3	20	20	100.0	418 ± 31.97	544 ± 119.72	0.74
	4	28	28	100.0	477 ± 29.27	874 ± 250.81	0.79
	5	38	38	100.0	504 ± 28.33	952 ± 165.48	0.74
	6	18	18	100.0	543 ± 37.19	1177 ± 236.44	0.73
	7	6	6	100.0	624 ± 81.00	1857 ± 848.94	0.73
	8	2	2	100.0	470 ± 147.08	815 ± 657.61	0.70
Total		122	121	99.2	483 ± 70.87	895 ± 412.16	0.75
Females	1	4	0	0.0	256 ± 37.13	128 ± 63.97	0.71
	2	11	6	54.5	411 ± 102.87	644 ± 651.11	0.77
	3	12	8	66.7	434 ± 29.85	613 ± 153.01	0.74
	4	27	26	96.3	497 ± 42.03	898 ± 207.57	0.72
	5	50	50	100.0	533 ± 31.60	1065 ± 189.43	0.70
	6	42	42	100.0	546 ± 39.21	1132 ± 269.19	0.69
	7	25	24	96.0	588 ± 46.82	1394 ± 388.64	0.67
	8	2	2	100.0	632 ± 96.17	1825 ± 926.31	0.69
	9	2	2	100.0	664 ± 79.20	2320 ± 989.95	0.76
	10	2	2	100.0	786 ± 2.83	3625 ± 106.07	0.75
	14	1	1	100.0	968 ± -	7140 ± -	0.79
Total		178	163	91.6	526 ± 89.29	1110 ± 678.02	0.70
Both	1	5	0	0.0	252 ± 33.38	123 ± 56.38	0.73
	2	20	15	75.0	395 ± 78.56	531 ± 494.72	0.75
	3	32	28	87.5	424 ± 31.66	570 ± 134.97	0.74
	4	55	54	98.2	487 ± 37.19	886 ± 228.78	0.76
	5	88	88	100.0	521 ± 33.47	1016 ± 187.12	0.72
	6	60	60	100.0	545 ± 38.31	1146 ± 258.64	0.70
	7	31	30	96.8	595 ± 55.32	1484 ± 524.86	0.69
	8	4	4	100.0	551 ± 137.99	1320 ± 877.61	0.69
	9	2	2	100.0	664 ± 79.20	2320 ± 989.95	0.76
	10	2	2	100.0	786 ± 2.83	3625 ± 106.07	0.75
	14	1	1	100.0	968 ± -	7140 ± -	0.79
Total		300	284	94.7	508 ± 84.81	1022 ± 593.35	0.72

± = standard deviation

Table 28. Age specific size and maturity conditions of northern pike from West Cross Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± (mm)	s.d.	Wt ± (g)	s.d.	Mean Condition Factor
Males	0	1	0	0.0	284 ±	-	166 ±	-	0.72
	1	1	1	100.0	412 ±	-	466 ±	-	0.67
	2	6	6	100.0	431 ±	38.48	590 ±	180.84	0.72
	3	10	10	100.0	495 ±	54.19	846 ±	294.38	0.67
	4	14	14	100.0	543 ±	42.53	1140 ±	347.05	0.70
	5	5	5	100.0	552 ±	65.66	1154 ±	504.36	0.66
	6	4	4	100.0	591 ±	50.61	1334 ±	324.40	0.64
	8	1	1	100.0	736 ±	-	3160 ±	-	0.79
Total		42	41	97.6	517 ±	82.90	1020 ±	530.93	0.69
Females	1	1	1	100.0	722 ±	-	2660 ±	-	0.71
	2	4	4	100.0	455 ±	53.10	697 ±	292.65	0.71
	3	15	14	93.3	514 ±	45.78	923 ±	249.90	0.67
	4	34	31	91.2	564 ±	49.77	1242 ±	343.25	0.68
	5	17	16	94.1	632 ±	68.76	1774 ±	836.94	0.67
	6	13	12	92.3	626 ±	62.18	1656 ±	451.45	0.66
	7	9	9	100.0	649 ±	90.84	2049 ±	750.41	0.74
	8	1	1	100.0	858 ±	-	5000 ±	-	0.79
	9	1	1	100.0	484 ±	-	780 ±	-	0.69
	10	1	1	100.0	808 ±	-	4040 ±	-	0.77
Total		96	90	93.8	587 ±	86.83	1474 ±	780.05	0.68
Both	0	1	0	0.0	284 ±	-	166 ±	-	0.72
	1	2	2	100.0	567 ±	219.20	1563 ±	1551.39	0.69
	2	10	10	100.0	441 ±	43.66	633 ±	223.13	0.71
	3	25	24	96.0	507 ±	49.16	892 ±	265.39	0.67
	4	48	45	93.8	558 ±	48.29	1212 ±	343.85	0.68
	5	22	21	95.5	614 ±	75.01	1633 ±	807.94	0.67
	6	17	16	94.1	618 ±	60.17	1580 ±	438.74	0.65
	7	9	9	100.0	649 ±	90.84	2049 ±	750.41	0.74
	8	2	2	100.0	797 ±	86.27	4080 ±	1301.08	0.79
	9	1	1	100.0	484 ±	-	780 ±	-	0.69
	10	1	1	100.0	808 ±	-	4040 ±	-	0.77
Total		138	131	94.9	565 ±	91.28	1336 ±	741.70	0.68

± = standard deviation

Table 29. Length-weight regressions for fish caught from Sipiwesk Lake, 1989.

Species	Length-weight equation	r	n
Whitefish	$\log_e$ weight = -13.193 + 3.371 ($\log_e$ length)	0.998	8
Cisco	$\log_e$ weight = -13.452 + 3.423 ($\log_e$ length)	0.994	100
Walleye	$\log_e$ weight = -12.171 + 3.128 ($\log_e$ length)	0.994	262
Sauger	$\log_e$ weight = -10.532 + 2.817 ($\log_e$ length)	0.971	34
Northern pike	$\log_e$ weight = -11.268 + 2.907 ($\log_e$ length)	0.979	300
White sucker	$\log_e$ weight = -11.840 + 3.136 ($\log_e$ length)	0.993	361
Longnose sucker	$\log_e$ weight = -16.756 + 3.909 ($\log_e$ length)	0.997	3
Shorthead redhorse sucker	$\log_e$ weight = -12.974 + 3.332 ($\log_e$ length)	0.992	29
Mooneye	$\log_e$ weight = -11.368 + 3.021 ($\log_e$ length)	0.978	315
Goldeye	$\log_e$ weight = -13.126 + 3.296 ($\log_e$ length)	0.986	10
Yellow perch	$\log_e$ weight = -12.093 + 3.170 ($\log_e$ length)	0.982	82
Burbot	insufficient data		1
Freshwater drum	insufficient data		2

Table 30. Length-weight regressions for fish caught from West Cross Lake, 1989.

Species	Length-weight equation	r	n
Whitefish	$\log_e$ weight = -14.385 + 3.540 ($\log_e$ length)	0.992	11
Cisco	$\log_e$ weight = -12.152 + 3.185 ($\log_e$ length)	0.996	89
Walleye	$\log_e$ weight = -11.513 + 3.022 ($\log_e$ length)	0.979	391
Sauger	$\log_e$ weight = -12.660 + 3.197 ($\log_e$ length)	0.986	15
Northern pike	$\log_e$ weight = -11.856 + 2.993 ($\log_e$ length)	0.975	138
White sucker	$\log_e$ weight = -11.817 + 3.132 ($\log_e$ length)	0.998	72
Shorthead redhorse sucker	$\log_e$ weight = -12.625 + 3.272 ($\log_e$ length)	0.967	22
Mooneye	$\log_e$ weight = -11.723 + 3.093 ($\log_e$ length)	0.991	13
Goldeye	$\log_e$ weight = -10.653 + 2.876 ($\log_e$ length)	0.996	3
Yellow perch	$\log_e$ weight = - 9.550 + 2.690 ($\log_e$ length)	0.986	28

Table 31. Mortality and survival estimates for whitefish, cisco, walleye, sauger, and northern pike from Sipiwesk and Cross lakes, 1989.

Species	Lake	Instantaneous mortality (Z)	Annual mortality (A)	Annual survival (S)	r	Age classes used
Whitefish	Sipiwesk		**			
	W. Cross		**			
Cisco	Sipiwesk	0.211	0.189	0.810	0.992	4-14[1].
Walleye	Sipiwesk	0.221	0.199	0.801	0.903	8-26[2].
	W. Cross	0.264	0.231	0.768	0.910	9-19[3].
Sauger	Sipiwesk	0.272	0.238	0.762	0.927	7-14[4].
	W. Cross	0.124	0.116	0.884	0.583	7-13[5].
Northern pike	Sipiwesk	0.507	0.398	0.602	0.859	6-14[6].
	W. Cross	0.736	0.521	0.479	0.965	5-10

1. age classes combined: 6, 7 and 8; 9 and 10; 11 and 12.
2. age classes combined: 9 and 10; 11 and 12; 14 and 15; while ages 18, 20, 21, 23 and 25 were missing.
3. age classes combined: 9 and 10; 11, 12 and 13; 14 and 15.
4. ages 10 and 13 missing.
5. ages 11 and 12 missing.
6. ages 11-13 missing.

** = insufficient data to do reasonable analysis.

Table 32. Maturity rate equations and age at maturity for whitefish, cisco, walleye, sauger and northern pike from Sipiwesk and Cross lakes, 1989.

Species	Lake	Sex	Regression	r	Age at 50% mature	Age classes used
Whitefish	Sipiwesk	all	**			
	W. Cross	all	***			
Cisco	Sipiwesk	all	**			
	W. Cross	all	**			
Walleye	Sipiwesk	males	**			
		females	10.165 - 1.395 (x)	0.999	7.3	6-8
		both	8.391 - 1.243 (x)	0.990	6.8	6-8
	W. Cross	males	8.228 - 1.123 (x)	0.989	7.3	5-10
		females	**			
		both	6.587 - 1.003 (x)	0.987	6.6	5-10
Sauger	Sipiwesk	all	**			
	W. Cross	all	**			
Northern pike	Sipiwesk	males	**			
		females	3.240 - 1.539 (x)	0.993*	2.1	2-4
		both	2.003 - 1.450 (x)	0.972*	1.4	2-4
	W. Cross	all	**			

* non-significant at P = 0.05.
** unable to do reasonable regression analysis.
*** all fish were mature.

Table 33. Walford equation data for whitefish, cisco, walleye, sauger and northern pike from Sipiwesk and West Cross lakes, 1989.

Species	Lake	Walford equation	L_{∞}	Age classes used	r
Whitefish	Sipiwesk	**			
	W. Cross	**			
Cisco	Sipiwesk	86.231 + 0.770 (x)	375	2-8	0.988
	W. Cross	92.126 + 0.753 (x)	372	1-5	0.989
Walleye	Sipiwesk	86.969 + 0.801 (x)	435	2-11	0.971
	W. Cross	102.749 + 0.778 (x)	462	1-11	0.980
Sauger	Sipiwesk	**			
	W. Cross	**			
Northern pike	Sipiwesk	205.723 + 0.660 (x)	605	1-7	0.941
	W. Cross	189.569 + 0.730 (x)	701	2-7	0.969

** insufficient data to do reasonable analysis.

Table 34. Brody relationships for whitefish, cisco, walleye, sauger, and northern pike from Sipiwesk and West Cross lakes, 1989.

Species	Lake	$Log_e (L_\infty - lt) = a-b.t$	Age range (years)	r
Whitefish	Sipiwesk	**		
	W. Cross	**		
Cisco	Sipiwesk	5.909 - 0.265 (x)	2-8	0.996
	W. Cross	5.727 - 0.293 (x)	1-5	0.996
Walleye	Sipiwesk	5.945 - 0.219 (x)	2-11	0.977
	W. Cross	6.070 - 0.288 (x)	1-11	0.982
Sauger	Sipiwesk	**		
	W. Cross	**		
Northern pike	Sipiwesk	6.155 - 0.344 (x)	1-6	0.994
	W. Cross	6.197 - 0.317 (x)	2-7	0.989

** = insufficient data to do reasonable analysis.

Table 35. Least squares regression full transformation (power curve) analysis of variance summaries for growth curves from whitefish, cisco, walleye, sauger and northern pike from Sipiwesk and West Cross lakes, 1989.

Species	Lake	Equation	r	d.f.	F. ratio
Whitefish	Sipiwesk	165.086 x 0.458	0.992	1, 3	118.26
	W. Cross	275.791 x 0.239	0.960	1, 4	35.24
Cisco	Sipiwesk	136.491 x 0.391	0.955	1, 12	112.85
	W. Cross	148.842 x 0.422	0.990	1, 5	194.19
Walleye	Sipiwesk	177.117 x 0.309	0.930	1, 19	114.85
	W. Cross	199.683 x 0.316	0.966	1, 17	222.14
Sauger	Sipiwesk	213.427 x 0.184	0.864	1, 8	20.54
	W. Cross	180.126 x 0.258	0.870	1, 8	21.75
Northern pike	Sipiwesk	258.178 x 0.448	0.970	1, 10	141.67
	W. Cross	332.802 x 0.378 [1.]	0.973	1, 7	104.71

** insufficient data to do reasonable analysis.

1. ages 0+, 1 and 9 were omitted for regression analysis.

ACKNOWLEDGEMENTS

Field data was collected by Barry Cherepak, Kathleen Francois, Kelly Martinussen, Jeff Vermette and Gabe Chartrand.

Thank-you Jeanette Forte for typing this report.

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Appendix 1. List of Manitoba Department of Natural Resources Fisheries Branch reports written to date on data collected from the Churchill-Nelson River Diversion under the Northern Flood Agreement Claim numbers 12 and 18. Documents are listed in chronological order of publication.

Year	Title
1984	Patalas, J.W. 1984. Fish population data from Sipiwesk, Split and Stephens lakes, 1983. Man. Dept. Nat. Res. Fish. Br. MS Report No. 84-24, 66pp.
	_____1984. Fish population data from Notigi, Wapisu, Threepoint and Footprint lakes, 1983. Man. Dept. Nat. Res. Fish. Br. MS Report No. 84-25, 70pp.
1986	Derksen, A.J. 1986. Ecological Monitoring - Fisheries 1985 Progress Report. Man. Dept. Nat. Res. Fish. Br. April 9, 1986. 43.pp.
	Kirton, J.A.W. 1986. Fish population data from Rat, Karsakuwigamak, and West West and Central Mynarski lakes, 1984. Man. Dept. Nat. Res. Fish. Br. MS Report No. 86-03, 48pp.
	_____1986. Fish population data from Split and Stephens lakes, 1984. Man. Dept. Nat. Res. Fish. Br. MS Report No. 86-04, 61pp.
	Green, D.J. 1986. Summary of Fish mercury data collected from lakes on the Rat-Burntwood and Nelson River systems, 1983-1985. Man. Dept. Nat. Res. MS Report No. 86-06, 359 pp.
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1987	Sopuck, R. D. 1987. A study of lake sturgeon (Acipenser fulvescens) in the Sipiwesk Lake area of the Nelson River, Manitoba, 1976-1978. Man. Dept. Nat. Res., Fish. Br. MS Report No. 87-2, 59pp.
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